

ASSESSORS' HANDBOOK  
SECTION 534

RURAL BUILDING COSTS

JANUARY 2010

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CALIFORNIA STATE BOARD OF EQUALIZATION

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## FOREWORD

This edition of Assessors' Handbook Section 534 (AH 534), *Rural Building Costs*, updates some costs contained in previous editions and includes new data. In previous years, hard copies of the loose-leaf pages were made available to interested parties. However, due to budget constraints, the 2010 version of AH 534 is only available on the Board's website.

Although diligent efforts have been made to supply accurate and reliable information, it is very important to temper this data with local costs where appropriate since construction costs may vary both within and among counties. Also, costs for permits and fees to construct buildings have changed throughout the state. AH 534 should serve as a guide, but an appraiser must research the market to determine which costs are most applicable for the appraisal assignment and consider the data provided in AH 534 along with local cost data.

This revision was prepared by County-Assessed Properties Division staff under the direction of the Property and Special Taxes Department.

/s/ David J. Gau

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# RURAL BUILDING COSTS

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# AH 534.00: COSTING INFORMATION

## STATUTORY BASIS

Assessors' Handbook Section 534 (AH 534) was designed and developed for use by the 58 California counties as an aid to assessors in fulfilling their statutory requirement in the assessment of all taxable property in the county.<sup>1</sup>

The work in AH 534 is guided by Property Tax Rule 6<sup>2</sup> and Revenue and Taxation Code section 401.5. Rule 6 provides in part:

(a) The reproduction or replacement cost approach to value is used in conjunction with other value approaches and is preferred when neither reliable sales data (including sales of fractional interests) nor reliable income data are available and when the income from the property is not so regulated as to make such cost irrelevant. It is particularly appropriate for construction work in progress and for other property that has experienced relatively little physical deterioration, is not misplaced, is neither over- nor underimproved, and is not affected by other forms of depreciation or obsolescence.

(b) The reproduction cost of a reproducible property may be estimated either by (1) adjusting the property's original cost for price level changes and for abnormalities, if any, or (2) applying current prices to the property's labor and material components, *with appropriate additions for entrepreneurial services*, interest on borrowed or owner-supplied funds, and other costs typically incurred in bringing the property to a finished state (or to a lesser state if unfinished on the lien date). Estimates made under (2) above may be made by using square-foot, cubic foot, or other unit costs; a summation of the in-place costs of all components; a quantity survey of all material, labor, and other cost elements; or a combination of these methods. [Emphasis added.]

Section 401.5 reads as follows:

The board shall issue to assessors data relating to costs of property, or, with respect to commercial and industrial property, shall, after a public hearing, review and approve commercially available data, and shall issue to assessors other information as in the judgment of the board will promote uniformity in appraisal practices and in assessed values throughout the state. *An assessor shall adapt data received pursuant to this section to local conditions and may consider that data together with other factors as required by law in the assessment of property for tax purposes.* [Emphasis added.]

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<sup>1</sup> Revenue and Taxation Code section 405.

<sup>2</sup> Title 18, Public Revenues, California Code of Regulations, section 6.

## BASIS OF COST

Costs to construct improvements such as barns, greenhouses, steel buildings, etc., in this handbook are based on the cost to build on a level and cleared site in California as of the date in the lower right-hand corner of each page. The costs are contingent on the following assumptions:

- A clear site
- Normal soil conditions
- Adequate site drainage
- No off-site improvement cost

The costs in this handbook include normal expenses incurred in placing the improvement or component in the hands of the ultimate consumer, including the following:

1. Excavation for foundations, piers, and other structural foundation components, considering a level site
2. Materials
3. Labor
4. Architectural fees
5. Engineering fees
6. Supervision
7. Permits for improvements, land use, environmental impact, etc.
8. Normal utility hook-ups, if any
9. Contractor's overhead and profit
10. Contingencies
11. Carrying charges during construction
  - Taxes
  - Interest
  - Insurance
12. Legal expenses

All data are in the form of in-place costs for improvements and additives that may differ between various structures.

***The costs in this handbook do not include entrepreneurial profit except where noted.*** It is, therefore, necessary for the appraiser to add an appropriate market adjustment for entrepreneurial profit where appropriate for real property improvements.

# GLOSSARY OF TERMS

| Term                    | Definition  |
|-------------------------|---|
| <b>Chime Joists</b>     | Wooden support members that are placed under the bottom of a redwood storage tank.  |
| <b>Free-stall Barn</b>  | A building that contains individual stalls where a cow may enter, lie down, or leave without restriction.   |
| <b>Hopper</b>           | An elevated bin with a cone-shaped bottom. A gate at the bottom, when opened, allows the stored material to be emptied due to the sloping sides of the cone.  |
| <b>Pole Building</b>    | A building whose main frame and foundation are treated posts or piles, sunk into the ground with prefabricated trusses and metal siding.  |
| <b>Polycarbonate</b>    | A class of resins that are used to produce tough, transparent items, such as roof material and siding of greenhouses.   |
| <b>Quonset Building</b> | A prefabricated metal building with a curved roof that extends to the ground forming the sides of the building.   |
| <b>Ripping</b>          | The term used in agriculture to indicate plowing or breaking up of soil. The result is a reduction in compacted soil.   |
| <b>Silage</b>           | A type of foodstuff for livestock, prepared from green crops (for example, grass). The crops are stored in a pit or silo. The bacteria on the plants carry out fermentation resulting in the preservation of the plant material from further decay and loss of nutritional value. |
| <b>Unloading Auger</b>  | A screw-like device that rotates resulting in the horizontal movement of stored material out of a storage bin.  |
| <b>Wind Machines</b>    | Elevated fans used to provide frost protection for crops.   |

## AH 534.10: BASIC FARM BUILDINGS

This chapter contains specifications and costs for various basic farm buildings including the following:

- Prefabricated horse barns/riding arenas
- Steel frame riding arena
- General purpose barns
- Hay storage barns
- Feed barns
- Pole buildings
- Shops
- Machinery and equipment sheds
- Prefabricated wood storage sheds
- Small sheds

Photographs showing examples of the buildings discussed are located at the end of this chapter.

### PREFABRICATED HORSE BARNS

#### SPECIFICATIONS

|            |   |
|------------|---|
| Structure  | 6" steel purlins on 6' centers; enamel exterior                       |
| Foundation | Concrete piers  |
| Floor      | Dirt  |
| Door       | Sliding stall (inside tract)  |
| Roof       | 2" x 12" pitch; skylight in each stall                                |
| Roofing    | White 26 gauge steel hi-rib   |
| Walls      | Laminated wall panels; grilled fronts; top 4'; 5" colored gutter trim |

#### IN-LINE SHED ROW BARN

| Stall Size | First Stall | Each Additional Stall |
|------------|-------------|-----------------------|
| 12' x 12'  | \$3,900     | \$3,600               |
| 12' x 16'  | 4,600       | 4,200                 |

Shed roof overhang per square foot:   8' — **\$5.25**  
  12' — **\$5.80**

*(Photograph shown on AH 534.10, page 11)*

# BASIC FARM BUILDINGS

## PREFABRICATED HORSE BARNS

### GABLE ROOF BARN—STANDARD BREEZEWAY

| Stall Size                   | First Two Stalls | Each Additional Two |
|------------------------------|------------------|---------------------|
| 12' x 12' with 12' breezeway | \$9,900          | \$8,400             |
| 12' x 12' with 16' breezeway | 10,300           | 8,700               |
| 12' x 16' with 12' breezeway | 11,300           | 9,900               |
| 12' x 16' with 16' breezeway | 11,700           | 10,500              |

### GABLE ROOF BARN—RAISED BREEZEWAY

| Stall Size                   | First Two Stalls | Each Additional Two |
|------------------------------|------------------|---------------------|
| 12' x 12' with 12' breezeway | \$10,700         | \$9,270             |
| 12' x 12' with 16' breezeway | 11,500           | 9,990               |
| 12' x 16' with 12' breezeway | 12,200           | 11,000              |
| 12' x 16' with 16' breezeway | 12,350           | 11,800              |

Roof extension per square foot—**\$5.80**

12-foot breezeway doors—**\$780** each

16-foot breezeway doors—**\$890** each

*(Photographs shown on AH 534.10, pages 11 and 12)*

### ADDITIVES

| Item   | Cost                             |
|--|----------------------------------|
| Concrete floor                                 | \$4.60 - \$5.00 per square foot  |
| Full footing                                   | \$13.00 per linear foot          |
| Portable 5'-4 rail corral panels               | \$8.25 - \$10.30 per linear foot |
| Portable 5'-5 rail corral panels               | \$9.25 - \$11.30 per linear foot |
| Portable 6' rail corral panels with metal roof | \$5.60 - \$6.70 per square foot  |

## STEEL FRAME RIDING ARENA

|                       |   |
|-----------------------|---|
| Frame                 | Good quality steel frame, 14' to 16' eave height          |
| Roof                  | Gable roof with 26-gauge panels                           |
| Walls                 | None  |
| Floor                 | Sand  |
| Plumbing              | Minimum water outlets                                     |
| Electrical            | None—or add <b>\$.60</b> to <b>\$1.00</b> per square foot |
| Cost                  | <b>\$10.20</b> to <b>\$11.50</b> per square foot          |
| Add for vinyl fencing | <b>\$10.20</b> to <b>\$11.30</b> per linear foot          |

*(Photographs shown on AH 534.10, page 13)*



# BASIC FARM BUILDINGS

## GENERAL PURPOSE BARNs

### BUILDING SPECIFICATIONS

| Components        | Class 1<br>Fair Quality   | Class 2<br>Average Quality                 | Class 3<br>Good Quality                |
|-------------------|---|--|--|
| Foundation        | Redwood or cedar mudsills   | Concrete or masonry piers                  | Continuous concrete                    |
| Floor             | Dirt  | Dirt/some concrete                         | Concrete                               |
| Wall Structure    | Light wood frame, 10' eave height   | Average wood frame, 10' eave height        | Good wood frame, 10' eave height       |
| Roof Construction | Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses | Medium to high pitch—average wood trusses  | Medium to high pitch—good wood trusses |
| Roof Cover        | Light aluminum  | Standard gauge corrugated iron or aluminum | 26-gauge steel                         |
| Electrical        | None  | Two outlets per 1,000 square feet          | Four outlets per 1,000 square feet     |
| Plumbing          | None  | One cold water outlet                      | Two cold water outlets                 |

*(Photographs shown on AH 534.10, pages 14, 15, and 16)*

### SQUARE-FOOT COSTS

| Class | Square-Foot Area |       |       |       |       |        |
|-------|------------------|-------|-------|-------|-------|--------|
|       | 1,000            | 3,000 | 5,000 | 7,000 | 9,000 | 11,000 |
| 1     | 15.25            | 11.80 | 10.90 | 10.55 | 10.10 | 9.90   |
| 2     | 20.50            | 16.70 | 15.55 | 14.95 | 14.60 | 14.10  |
| 3     | 31.25            | 25.65 | 23.65 | 22.80 | 22.30 | 21.75  |

# BASIC FARM BUILDINGS

## HAY STORAGE BARNs

### BUILDING SPECIFICATIONS

| Components          | Class 1<br>Fair Quality   | Class 2<br>Average Quality                            | Class 3<br>Good Quality                               |
|---------------------|---|---|---|
| Foundation          | Redwood or cedar mudsills   | Concrete or masonry piers                             | Continuous concrete                                   |
| Floor               | Dirt  | Dirt  | Concrete  |
| Wall Structure      | Light wood frame, 20' eave height   | Average wood frame, 20' eave height                   | Good wood frame, 20' eave height                      |
| Exterior Wall Cover | Light aluminum or low cost boards   | Standard gauge corrugated iron or aluminum            | Good wood siding, painted or 26-gauge steel           |
| Roof Construction   | Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses | Medium to high pitch—average wood trusses             | Medium to high pitch—good wood trusses                |
| Roof Cover          | Light aluminum  | Standard gauge corrugated iron or aluminum            | 26-gauge steel  |
| Electrical          | None  | Two outlets per 1,000 square feet                     | Four outlets per 1,000 square feet                    |
| Plumbing            | None  | One cold water outlet                                 | Two cold water outlets                                |
| Shape               | Nearly square, length between one and two times width                             | Nearly square, length between one and two times width | Nearly square, length between one and two times width |

*(Photograph shown on AH 534.10, page 17)*

### SQUARE-FOOT COSTS

| Class | Square-Foot Area |       |       |       |       |        |
|-------|------------------|-------|-------|-------|-------|--------|
|       | 1,000            | 3,000 | 5,000 | 7,000 | 9,000 | 11,000 |
| 1     | 12.10            | 10.15 | 9.20  | 8.50  | 8.20  | 7.80   |
| 2     | 13.95            | 11.50 | 10.50 | 9.80  | 9.30  | 9.00   |
| 3     | 22.80            | 18.90 | 17.50 | 16.00 | 15.30 | 14.65  |

**Adjustments:** Pole Buildings – Deduct 10% from above costs  
 No Electricity/No Water – Deduct **\$.75** to **\$1.00** per square foot

# BASIC FARM BUILDINGS

## FEED BARN

### BUILDING SPECIFICATIONS

| Components          | Class 1<br>Fair Quality   | Class 2<br>Average Quality   | Class 3<br>Good Quality                      |
|---------------------|---|--|--|
| Foundation          | Redwood or cedar mudsills   | Concrete or masonry piers  | Continuous concrete                          |
| Floor               | Dirt  | Concrete in center section   | Concrete                                     |
| Wall Structure      | Light wood frame, 8' eave height at drip line                                     | Average wood frame, 8' eave height at drip line                                      | Good wood frame, 8' eave height at drip line |
| Exterior Wall Cover | Open sides and ends   | Open sides, standard gauge corrugated iron, aluminum, or average wood siding on ends | Open sides, good siding painted on ends      |
| Roof Construction   | Medium to high pitch—2" x 4" rafters, 24" to 36" on center, or light wood trusses | Medium to low pitch—average wood trusses   | Medium to low pitch—good wood trusses        |
| Roof Cover          | Light aluminum  | Standard gauge corrugated iron or aluminum   | 26-gauge steel                               |
| Electrical          | None  | Two outlets per 1,000 square feet  | Four outlets per 1,000 square feet           |
| Plumbing            | None  | One cold water outlet  | Two cold water outlets                       |

*(Photographs shown on AH 534.10, page 18)*

### SQUARE-FOOT COSTS

| Class | Square-Foot Area |       |       |       |       |        |
|-------|------------------|-------|-------|-------|-------|--------|
|       | 1,000            | 3,000 | 5,000 | 7,000 | 9,000 | 11,000 |
| 1     | 8.25             | 7.40  | 7.05  | 6.75  | 6.90  | 6.85   |
| 2     | 13.05            | 11.95 | 11.55 | 11.35 | 11.25 | 11.20  |
| 3     | 15.40            | 14.15 | 13.80 | 13.55 | 13.45 | 13.40  |

# BASIC FARM BUILDINGS

## POLE BUILDINGS

### BUILDING SPECIFICATIONS

|           |   |
|-----------|---|
| Structure | Poles: 15' to 20' on center; wood or steel        |
| Floor     | Dirt  |
| Roof      | Light trusses; low to medium pitch; wood or steel |
| Roofing   | Galvanized steel or colored steel with gutter     |
| Walls     | None, wall height: 18' - 21' to plate             |

*(Photographs shown on AH 534.10, page 19)*

### SQUARE-FOOT COSTS

### ALL SIDES OPEN

### GOOD QUALITY

| End Width | Side Length |      |      |      |      |      |      |      |      |      |
|-----------|-------------|------|------|------|------|------|------|------|------|------|
|           | 30          | 50   | 80   | 100  | 120  | 140  | 150  | 160  | 180  | 200  |
| 20        | 7.45        | 7.30 | 7.15 | 7.00 | 6.90 | 6.75 | 6.70 | 6.60 | 6.55 | 6.55 |
| 30        | 7.05        | 6.90 | 6.70 | 6.45 | 6.35 | 6.25 | 6.15 | 6.10 | 6.05 | 6.00 |
| 40        | 6.60        | 6.40 | 6.05 | 6.00 | 5.85 | 5.75 | 5.70 | 5.70 | 5.70 | 5.70 |
| 50        | 6.25        | 6.05 | 5.85 | 5.70 | 5.50 | 5.40 | 5.40 | 5.40 | 5.40 | 5.40 |
| 60        | 5.90        | 5.75 | 5.50 | 5.45 | 5.40 | 5.40 | 5.40 | 5.40 | 5.40 | 5.40 |
| 70        | 5.90        | 5.70 | 5.50 | 5.45 | 5.40 | 5.40 | 5.40 | 5.35 | 5.35 | 5.35 |
| 80        | 5.90        | 5.70 | 5.50 | 5.45 | 5.40 | 5.40 | 5.40 | 5.35 | 5.35 | 5.35 |

Deduct 15% for light duty, fair quality construction.

|                       |   |
|-----------------------|---|
| Skylights (2' x 10')  | <b>\$105.00</b> each                          |
| Vents (14", Rotary)   | <b>\$210.00</b> each                          |
| Poles, In-Place       | <b>\$168 to \$230</b> each                    |
| Covered wall area add | <b>\$3.85</b> per square foot of wall surface |

### Reinforced Concrete Floors:

|    |                               |
|----|-------------------------------|
| 4" | <b>\$5.00</b> per square foot |
| 6" | <b>\$5.60</b> per square foot |

# BASIC FARM BUILDINGS

## SHOPS

### BUILDING SPECIFICATIONS

| Components          | Class 1<br>Fair Quality   | Class 2<br>Average Quality                                       | Class 3<br>Good Quality   |
|---------------------|---|--|---|
| Foundation          | Light concrete  | Light concrete   | Standard concrete   |
| Floor               | 3" concrete   | 4" concrete  | 4" reinforced concrete  |
| Wall Structure      | Light wood frame, 15' eave height   | Average wood frame, 15' eave height                              | Good wood frame, insulated, 15' eave height                       |
| Exterior Wall Cover | Light aluminum or low cost boards   | Standard gauge corrugated iron, aluminum, or average wood siding | Good wood siding painted or 26-gauge steel                        |
| Roof Construction   | Low to medium pitch— 2" x 4" rafters, 24" to 36" on center, or light wood trusses | Low to medium pitch— average wood trusses                        | Medium pitch— good wood trusses, insulated roof                   |
| Roof Cover          | Light aluminum corrugated   | Standard gauge corrugated iron or aluminum                       | 26-gauge steel, with skylights                                    |
| Electrical          | Two outlets per 1,000 square feet   | Two outlets per 1,000 square feet                                | Excellent lighting and ample outlets                              |
| Plumbing            | None  | One cold water outlet  | Two cold water outlets  |
| Doors               | One light sliding or swinging door per 2,000 square feet                          | One average sliding or swinging door per 2,000 square feet       | One drive-thru door per 1,000 square feet plus one walk-thru door |
| Windows             | None  | None or few low cost   | 5 percent of floor area   |
| Shape               | Nearly square, length between one to three times width                            | Nearly square, length between one to three times width           | Nearly square, length between one to three times width            |

*(Photographs shown on AH 534.10, page 20)*

### SQUARE-FOOT COSTS

| Class | Square-Foot Area |       |       |       |       |       |       |       |       |        |
|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
|       | 1,000            | 1,500 | 2,000 | 2,500 | 3,000 | 4,000 | 5,000 | 6,000 | 8,000 | 10,000 |
| 1     | 18.23            | 16.70 | 15.65 | 14.85 | 14.15 | 13.85 | 13.44 | 12.75 | 12.70 | 12.35  |
| 2     | 22.75            | 20.80 | 19.60 | 18.95 | 18.25 | 17.40 | 16.70 | 16.35 | 16.00 | 15.65  |
| 3     | 26.30            | 25.70 | 24.90 | 23.85 | 22.80 | 22.10 | 21.40 | 20.65 | 19.95 | 19.20  |

# BASIC FARM BUILDINGS

## MACHINERY AND EQUIPMENT SHEDS

### BUILDING SPECIFICATIONS

| Components          | Class 1<br>Fair Quality                                     | Class 2<br>Average Quality                                   | Class 3<br>Good Quality                                     |
|---------------------|---|--|---|
| Foundation          | Redwood or cedar mudsills                                   | Concrete or masonry piers                                    | Continuous concrete   |
| Floor               | Dirt  | Concrete   | Concrete  |
| Wall Structure      | Light wood frame, 10' to 12' eave height                    | Average wood frame, 10' to 12' eave height                   | Good wood frame, 10' to 12' eave height                     |
| Exterior Wall Cover | Light aluminum or low cost boards                           | Standard gauge corrugated iron or aluminum                   | Good wood siding, painted or 26-gauge steel                 |
| Roof Construction   | Low to medium pitch—shed type, light wood framing           | Low to medium pitch—gable or shed type, average wood framing | Low to medium pitch—gable or shed type, good wood framing   |
| Roof Cover          | Light aluminum  | Standard gauge corrugated iron or aluminum                   | 26-gauge steel, with skylights                              |
| Electrical          | None  | Two outlets per 1,000 square feet                            | Four outlets per 1,000 square feet                          |
| Shape               | Usually elongated, width between 20 and 40 feet, any length | Usually elongated, width between 20 and 40 feet, any length  | Usually elongated, width between 20 and 40 feet, any length |

*(Photographs shown on AH 534.10, page 21)*

### SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

| Class | Square-Foot Area |       |       |       |       |       |       |       |       |       |       |
|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | 500              | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 6,000 |
| 1     | 11.00            | 9.90  | 9.20  | 8.90  | 8.75  | 8.65  | 8.60  | 8.55  | 8.45  | 8.35  | 8.20  |
| 2     | 16.22            | 14.15 | 13.40 | 13.15 | 12.85 | 12.75 | 12.60 | 12.40 | 12.35 | 12.30 | 11.90 |
| 3     | 21.00            | 18.95 | 17.60 | 17.30 | 16.90 | 16.80 | 16.60 | 16.45 | 16.35 | 16.25 | 16.00 |

### SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

| Class | Square-Foot Area |       |       |       |       |       |       |       |       |       |       |
|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | 500              | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | 6,000 |
| 1     | 9.70             | 8.15  | 7.65  | 7.40  | 7.30  | 7.15  | 7.05  | 7.00  | 6.95  | 6.90  | 6.85  |
| 2     | 14.85            | 12.75 | 11.75 | 11.35 | 11.05 | 10.95 | 10.70 | 10.80 | 10.65 | 10.55 | 10.50 |
| 3     | 19.35            | 18.15 | 17.50 | 16.80 | 16.30 | 16.10 | 15.95 | 15.80 | 15.75 | 15.60 | 15.55 |

Pole Buildings – Deduct 10 to 15% from above costs.

# BASIC FARM BUILDINGS

## PREFABRICATED WOOD STORAGE SHEDS

Prefabricated wood storage sheds are normally purchased at lumber yards and home improvement centers.

### BUILDING SPECIFICATIONS

|                     |  |
|---------------------|--|
| Foundation          | 4" x 4" pressure treated skids                           |
| Floor               | Plywood or particleboard on 2" x 6" floor joists         |
| Walls Structure     | 2" x 4" framing on 24" centers, 6 ½' to 7 ½' eave height |
| Exterior Wall Cover | Plywood or T-1-11 with one 4' x 6' door                  |
| Roof                | Gable low to medium pitch, 2" x 4" rafters               |
| Roof Cover          | Metal or composition shingles                            |

*(Photographs shown on AH 534.10, page 22)*

### SQUARE-FOOT COSTS

| Square Feet | Price Per Square Foot |
|-------------|-----------------------|
| 50 to 74    | \$26.95               |
| 75 to 99    | \$23.65               |
| 100 to 139  | \$21.45               |
| 140 to 199  | \$20.35               |
| 200 and up  | \$17.60 - \$19.80     |

### ADDITIVES

|                      |         |  |
|----------------------|---------|--|
| Windows              | 2' x 2' | <b>\$137.50</b>                        |
|                      | 3' x 2' | <b>\$159.50</b>                        |
| Doors—Double 6' Wide |         | <b>\$165.00</b>                        |
| Skylight—2' x 2'     |         | <b>\$154.00</b>                        |
| Turbine Vent         |         | <b>\$90</b>                            |
| Shelves—16" wide     |         | <b>\$4.50</b> per linear foot          |
| Shelves—24" wide     |         | <b>\$5.00</b> per linear foot          |
| Workbench—24" wide   |         | <b>\$7.00</b> per linear foot          |
| Steel roll-up door   |         | <b>\$75</b> per foot (width)           |
| Loft                 |         | <b>\$4.40</b> per square foot          |
| Extra Concrete       |         | <b>\$5.50 - \$6.60</b> per square foot |

# BASIC FARM BUILDINGS

## SMALL SHEDS

### BUILDING SPECIFICATIONS

| Components          | Class 1<br>Fair Quality                                    | Class 2<br>Average Quality                                     | Class 3<br>Good Quality                                    |
|---------------------|--|--|--|
| Foundation          | Redwood or cedar mudsills                                  | Concrete or masonry piers                                      | Continuous concrete  |
| Floor               | Dirt   | Boards   | Concrete   |
| Wall Structure      | Light wood frame, 8' eave height                           | Average wood frame, 8' eave height                             | Good wood frame, 8' eave height                            |
| Exterior Wall Cover | Light aluminum or low cost boards                          | Standard gauge corrugated iron or aluminum, or average framing | Good wood siding, painted, or steel                        |
| Roof Construction   | Low to medium pitch—shed type, light wood framing          | Low to medium pitch—gable or shed type, average wood framing   | Low to medium pitch—gable or shed type, good wood framing  |
| Roof Cover          | Light aluminum   | Standard gauge corrugated iron or aluminum                     | Good steel cover; composition shingles                     |
| Electrical          | None   | None   | None   |
| Shape               | Usually elongated, width between 6 and 12 feet, any length | Usually elongated, width between 6 and 12 feet, any length     | Usually elongated, width between 6 and 12 feet, any length |

### SQUARE-FOOT COSTS—TYPE I, ALL SIDES CLOSED

| Class | Square-Foot Area |       |       |       |       |       |       |       |       |       |       |
|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | 50               | 60    | 80    | 100   | 120   | 150   | 200   | 250   | 300   | 400   | 500   |
| 1     | 19.03            | 17.25 | 15.41 | 13.17 | 12.65 | 11.79 | 11.39 | 10.93 | 10.35 | 10.01 | 9.55  |
| 2     | 26.80            | 24.09 | 21.79 | 20.07 | 19.09 | 18.17 | 17.37 | 16.39 | 15.41 | 14.95 | 14.61 |
| 3     | 32.89            | 29.56 | 28.18 | 26.34 | 24.55 | 22.60 | 21.33 | 20.47 | 19.49 | 19.09 | 18.63 |

### SQUARE-FOOT COSTS—TYPE II, ONE SIDE OPEN

| Class | Square-Foot Area |       |       |       |       |       |       |       |       |       |       |
|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | 50               | 60    | 80    | 100   | 120   | 150   | 200   | 250   | 300   | 400   | 500   |
| 1     | 13.32            | 12.08 | 10.79 | 9.22  | 8.86  | 8.25  | 7.97  | 7.65  | 7.25  | 7.00  | 6.68  |
| 2     | 18.76            | 16.86 | 15.25 | 14.05 | 13.36 | 12.72 | 12.16 | 11.47 | 10.79 | 10.47 | 10.22 |
| 3     | 23.02            | 20.69 | 19.72 | 18.43 | 17.19 | 15.82 | 14.93 | 14.33 | 13.64 | 13.36 | 13.04 |



# **BASIC FARM BUILDINGS**

## **PREFABRICATED HORSE BARNS**



**SHED ROW WITH 8 FOOT ROOF EXTENSION**



**GABLE ROOF WITH RAISED BREEZEWAY**

# **BASIC FARM BUILDINGS**

## **PREFABRICATED HORSE BARNS**



**GABLE ROOF—RAISED BREEZEWAY WITH ROOF EXTENSION**



**12' X 12' STALL**

# BASIC FARM BUILDINGS

## STEEL FRAME RIDING ARENA



# BASIC FARM BUILDINGS

## GENERAL PURPOSE BARN



# BASIC FARM BUILDINGS

## GENERAL PURPOSE BARN



# BASIC FARM BUILDINGS

## GENERAL PURPOSE BARN



# BASIC FARM BUILDINGS

## HAY STORAGE BARN



# BASIC FARM BUILDINGS

## FEED BARN





# BASIC FARM BUILDINGS

## POLE BUILDINGS



# BASIC FARM BUILDINGS

## SHOPS



# BASIC FARM BUILDINGS

## MACHINERY AND EQUIPMENT SHEDS



# BASIC FARM BUILDINGS

## PREFABRICATED WOOD STORAGE SHEDS



## AH 534.20: DAIRY BARNS

This chapter contains structures and equipment typically used at a dairy. Specifications and costs are provided for the following:

- Commonly used milking parlors
- Modern Herringbone barns
- Parallel barns
- Rotary barns
- Milking parlor
- Holding, wash, and drip area equipment
- Dairy equipment
- Freestall barn
- Hospital barn
- Corrals
- Commodity barns
- Hay barns
- Miscellaneous equipment
- Septic tanks
- Barn fans
- Feedlane stanchions with curb
- Silage pits
- Liquid manure systems
- Painted steel bulk feed tanks on concrete pad/with hopper bottom
- Grade "B" barns
- Stanchion barns
- Walk-through type barns

Photographs or drawings showing examples of the buildings discussed are located at the end of the chapter.

# DAIRY BARNs

## COMMONLY USED MILKING PARLORS

Three of the most common styles of milking barns found in California are referred to as the Herringbone, the Polygon, or the Parallel because of their design. The type most frequently found is the Herringbone or sawtooth design which also has several variations. For instance, the Polygon design is a parlor using multiple sets of Herringbone stalls. The Parallel design is gaining in popularity, especially in larger parlors. All three of these parlors have a central pit for the milker, with the cows elevated on one or all sides. An additional type is the Rotary parlor.

*(Drawings with descriptions shown on AH 534.20, page 14)*

## MODERN HERRINGBONE, PARALLEL, OR ROTARY

The high end of the cost range is for Sacramento and Northern California

The major electrical components to run the milking equipment—mains and subpanels, breakers and master start switches—are considered fixtures and are not included in building costs.

## EQUIPMENT ROOM, OFFICE, BREEZEWAY, MILK ROOM, RESTROOM, BATH

| Components                 | Average Quality  | Good Quality   |
|----------------------------|--|--|
| Foundation                 | Reinforced concrete  | Reinforced concrete  |
| Floors                     | Concrete slab  | Concrete slab, reinforced  |
| Walls                      | 8" concrete block  | Concrete block   |
| Exterior                   | Stucco or concrete block   | Stucco and masonry veneer, split face  |
| Roof Structure and Roofing | Average wood frame, corrugated iron roofing  | Good wood frame, good quality roofing or steel beams and good steel roofing or tile, skylights, gutters      |
| Windows                    | Metal sash, 10 percent of wall area  | Metal sash, 10 percent of wall area  |
| Interior                   | Smooth finish plaster—cove base  | Tile floors and walls, many areas  |
| Electrical                 | Conduit—average fixtures   | Conduit—excellent lighting and ample outlets   |
| Plumbing                   | One stainless steel sink, one water heater, one lavatory, one water closet, usual floor drains | One stainless steel sink, one water heater, ¾ bath, vinyl floor and tape, textured walls, usual floor drains |
| <b>Square-Foot Cost</b>    | <b>\$57.75 to \$66.00</b> per square foot  | <b>\$66.00 to \$72.60</b> per square foot  |

*(Drawings and photographs shown on AH 534.20, pages 15 – 20)*

# DAIRY BARNS

## MILKING PARLOR

|                            |   |
|----------------------------|---|
| Foundation                 | 6" reinforced concrete  |
| Floors                     | Concrete slab—well-formed gutters and mangers   |
| Walls                      | 6" or 8" concrete block or reinforced concrete 60" high with 2" x 6"—16" on center framing above, or all concrete block |
| Roof Structure and Roofing | Average wood frame, corrugated iron roofing or steel beams, good steel roofing, skylights                               |
| Windows                    | Metal sash or metal louvers   |
| Interior                   | Smooth plaster on entire surface of block walls or some combination of tile and plaster of good quality                 |
| Electrical                 | Conduit—average fixtures; ample lighting  |
| Plumbing                   | Usual floor drains and hose bibs  |
| <b>Square-Foot Cost</b>    | <b>Without gates and feeding equipment—\$38.50 to \$48.00 per square foot</b>   |

**Total Building Cost:** includes equipment room, milk room, office, bath, supply, milking parlor, and wash and drip area—Average quality **\$45.00 to \$57.00** per square foot  
 Good quality **\$58.00 to \$63.00** per square foot

## HOLDING, WASH, AND DRIP AREA EQUIPMENT

|  |  |
|--|--|
| Floor or Ramp                            | Sloping concrete with carborundum finish.<br><b>\$3.60 - \$4.20</b> per square foot  |
| Walls                                    | Concrete block 5' to 6' high with smooth plaster.<br><b>\$45.00 to \$50.00</b> per linear foot   |
| Metal Rail Fence                         | Welded pipe 7'—10' o.c. in concrete.<br><b>\$12.00 - \$14.00</b> per linear foot   |
| Cable Fence                              | 1 1/4" top rail, 2 7/8" post, 7' o.c.<br>3 cable— <b>\$9.00 to \$9.70</b> per linear foot<br>4 cable— <b>\$10.00 to \$11.00</b> per linear foot  |
| Gates                                    | 54" high, pipe with bracing.<br><b>\$15.00</b> per linear foot of gate width   |
| Sprinkler System                         | Hooded sprinkler, including pump. <b>\$152 - \$185</b> per sprinkler,<br>or per double 30 barn—60 cows <b>\$19,160 - \$21,525</b>  |
| Roof Structure and Roofing               | Average quality: Pipe supports, wood or light steel frame and corrugated iron roofing— <b>\$5.25 to \$7.90</b> per square foot<br>Good quality: Box beam columns, hot-dip galvanized and box beam galvanized rafters and purlins; quality steel roofing with skylights and electric lighting— <b>\$8.60 to \$10.10</b> per square foot |
| Total Area Cost Including All Components | <b>\$21.50 - \$25.90</b> per square foot   |

*(Photograph shown on AH 534.20, page 21)*

# DAIRY BARNS

## DAIRY EQUIPMENT

### PARALLEL STALLS (DOUBLE 30)

|  |          |
|--|----------|
| 2' x 30' parallel stall package includes galvanized reels, reel support post, sequencing panels, galvanized rump rail assembly, kick bar support, entrance gate, and hardware. 2' x 30' parallel drive kit includes air controls, air tubing, rump panels, drive guards, air cylinders, hardware, stainless steel curbing, and top rail. Air operated catch lane gates include air control ram, hardware to mount, step ladders with hand rails (front), and miscellaneous hardware. | \$97,600 |
|--|----------|

### VACUUM PUMP

|  |          |
|--|----------|
| Air vacuum pump with 30 HP motor, stand, pulleys, belts, guards, filter assembly, miscellaneous pipe valves, and electrical. | \$11,550 |
|--|----------|

### PIPELINE AND EQUIPMENT

|  |          |
|--|----------|
| Claws with pulsators and pulsator controller, master control panel, 2 HP milk pump, milk receiver, jetter assembly and hose, fresh air kit, clean-in-place sink. Also includes all stainless steel pipelines, elbows, valves, all PVC lines, electrical wiring and panels, and miscellaneous hardware. | \$93,900 |
|--|----------|

### MILK TRANSFER SYSTEM

|   |         |
|---|---------|
| Control assembly and miscellaneous equipment. | \$4,900 |
|---|---------|

### DETACHERS

|   |          |
|---|----------|
| Air operated retraction with both manual and automatic operation, indicator lights indicating milking mode and milk flow, air operated shutoff valve/sensor combination, all related electric wiring, air filter, and hardware. | \$81,600 |
|---|----------|

### MILK TANKS (7,000 GALLON)

|  |           |
|--|-----------|
| 2 stainless steel 7,000-gallon tanks with agitators and wash pumps. Includes control panel, calibration gauge, temperature recorder with probe assembly, hot milk alarm, miscellaneous piping, and electrical. | \$116,300 |
|--|-----------|

### REFRIGERATION SYSTEM

|   |          |
|---|----------|
| Freon compressor, air condensers, related hardware, pipes, valves, and electrical. Plate cooler with 100 plates and all hardware. | \$52,500 |
|---|----------|

Above costs include tax and labor



# DAIRY BARNS

## DAIRY EQUIPMENT

### HEAT RECOVERY SYSTEM

|  |          |
|--|----------|
| Heat recovery system and all hardware. | \$11,600 |
|--|----------|

### HOT WATER SYSTEM

|  |          |
|--|----------|
| Boiler with insulated 500-gallon storage tank, insulated piping, and electrical. | \$16,400 |
|--|----------|

### SPRINKLER PEN HARDWARE

|  |          |
|--|----------|
| Pumps, sprinklers, and all related pipelines and miscellaneous hardware. | \$22,100 |
|--|----------|

### AIR COMPRESSOR

|  |         |
|--|---------|
| 10 HP air compressor with 120-gallon tank. Includes miscellaneous hardware and electrical. | \$8,700 |
|--|---------|

### ELECTRIC OR AIR CROWD GATE

|   |          |
|---|----------|
| 30 to 50 foot electric gate with track and control kit, motor, panel, and electrical. | \$23,600 |
|---|----------|

Above costs include tax and labor

Total equipment cost for double 30 parallel \$540,000 Rounded

### EQUIPMENT ONLY (Including tax and labor)

|                        |                                       |
|------------------------|---------------------------------------|
| Double 14' Parallel    | Total - <b>\$311,000 to \$326,400</b> |
| Double 16' Parallel    | Total - <b>\$342,700 to \$357,000</b> |
| Double 18' Parallel    | Total - <b>\$367,200 to \$408,000</b> |
| Double 24' Herringbone | Total - <b>\$448,800 to \$484,500</b> |
| Double 25' Parallel    | Total - <b>\$464,100 to \$489,600</b> |
| Double 30' Parallel    | Total - <b>\$510,000 to \$555,900</b> |
| 50-Cow Rotary Barn     | Total - <b>\$622,200 to \$714,000</b> |
| 70-Cow Rotary Barn     | Total - <b>\$734,400 to \$765,000</b> |

# DAIRY BARNS

## FREESTALL BARN

### STANCHIONS, LOOPS, AND FENCES

|                |   |
|----------------|---|
| Foundation     | Reinforced concrete   |
| Floors         | Sloping concrete with dirt in loop areas. Concrete drive lanes and flush areas.   |
| Walls          | Open; poles with steel supports   |
| Roof Structure | Steel frame with steel cover; good quality, with gutters                          |
| Electrical     | Minimum lighting  |
| Plumbing       | Water troughs in each pen with underground flushing                               |
| Stanchions     | Steel; self locking – 5 hole per 10 feet  |
| Fencing        | Cable with steel or wood posts  |
| Capacity       | 250 to 600 cows; one stanchion per cow  |
| Cost           | <b>\$915 to \$1,170</b> per stanchion <b>or \$9.15 to \$11.70</b> per square foot |

Some barns now have 10% more stanchions and cows than beds.

Hot dipped galvanized steel framed barns – add 5% to above costs.

Cow water beds – **\$153 to \$188** each

*(Photographs shown on AH 534.20, page 22)*

## HOSPITAL BARN

### AVERAGE QUALITY

|            |  |
|------------|--|
| Floors     | Concrete slab with flush curbs   |
| Walls      | Light steel poles, all sides open                                      |
| Roof       | Average wood frame or light metal, with metal cover                    |
| Interior   | Several small pens with metal pipe fencing and gates and water troughs |
| Electrical | Average light fixtures   |
| Plumbing   | Concrete water troughs   |
| Cost       | <b>\$7.40 to \$8.00</b> per square foot                                |

Hospital barns without small divided pens, with dirt floors, low to average quality: **\$5.00 to \$6.00** per square foot

*(Photograph shown on AH 534.20, page 23)*

## DAIRY BARNS

### CORRALS

| Components                    | Cost   |
|-------------------------------|--|
| Concrete Flatwork             | 4" to 4½"— <b>\$2.10 to \$2.40</b> per square foot   |
| Large areas/not reinforced    | 6"— <b>\$2.50 to \$3.05</b> per square foot  |
| Rubber Belting                | <b>\$1.55 to \$2.35</b> per square foot  |
| Curbs                         | 8" x 16"— <b>\$7.35</b> per linear foot<br>8" x 24"— <b>\$8.90</b> per linear foot   |
| Cable Fence                   | 2 3/8" top rail, 2 7/8" post—10' o.c.<br>3 cable— <b>\$9.15 to \$9.70</b> per linear foot<br>4 cable— <b>\$9.75 to \$11.00</b> per linear foot |
| Concrete Water Tank           | <b>\$575 to \$630</b> each   |
| Steel Stanchions              | <b>\$45.15 to \$50.40</b> each hole  |
| Without Stanchion Curb        | <b>\$24.60 to \$27.80</b> per linear foot  |
| Steel Self-Locking Stanchions | <b>\$48.00 to \$52.00</b> each hole  |
| Without Stanchion Curb        | <b>\$23.50 to \$26.50</b> per linear foot  |
| 12" PVC Flush Line            | <b>\$11.55 to \$13.10</b> per foot   |
| Sump Pumps                    | 3 HP <b>\$2,845 to \$3,045</b><br>5 HP <b>\$3,830 to \$4,040</b>   |
| Floating Agitator Pump        | 75 HP <b>\$18,375 to \$20,575</b><br>40 HP <b>\$14,175 to \$15,225</b>   |
| Gates                         | 12' to 16'— <b>\$180 to \$225</b> each   |
| Loafing Sheds                 | Wood— <b>\$4.40 to \$5.65</b> per square foot<br>Steel— <b>\$5.25 to \$6.70</b> per square foot  |

### COMMODITY BARNS

|                  | Per Square Foot   |
|------------------|-------------------|
| With Dividers    | \$11.85 - \$17.30 |
| Without Dividers | \$10.25 - \$13.10 |

*(Photograph shown on AH 534.20, page 23)*

### COMMODITY BARN ADDITIVES

|                                    |   |
|------------------------------------|---|
| Concrete Dividers—8' high 6" thick | <b>\$121.00</b> per linear foot or <b>\$15.13</b> per square foot |
|------------------------------------|---|

### HAY BARNS

|            |  |
|------------|--|
| Floors     | Dirt   |
| Walls      | Open; used oil field pipe to support roof                  |
| Roof       | 20' eve; low pitch; light wood or steel frame; metal cover |
| Electrical | None   |
| Plumbing   | None   |
| Cost       | <b>\$3.47 to \$4.25</b> per square foot                    |

*(Photograph shown on AH 534.20, page 24)*

# DAIRY BARNs

## MISCELLANEOUS EQUIPMENT

### CURBS

|          | Per Linear Foot  |
|----------|------------------|
| 8" x 8"  | \$3.60 to \$4.70 |
| 8" x 16" | \$7.20 to \$8.20 |
| 8" x 20" | \$8.20           |

### CABLE FENCE

|  | Per Linear Foot   |
|--|---|
| 2 3/8" top rail with<br>2 7/8" post 10' o.c. | 3 cable—\$9.00 to \$9.50<br>4 cable—\$9.50 to \$10.50<br>5 cable—\$10.00 to 11.00 |
| Cattle guard                                 | \$1,287.50 to \$1,854.00 each   |

### SOLID RAIL FENCE

|   | Per Linear Foot    |
|---|--------------------|
| (4) 2 3/8" rails with<br>2 7/8" post 10' o.c. | \$12.35 to \$13.95 |

### TANKER PAD

|   | Per Square Foot  |
|---|------------------|
| 6" to 7" rebar reinforced concrete<br>with footings | \$2.85 to \$3.35 |

### WATER TROUGHS

|                                   |                |
|-----------------------------------|----------------|
| Concrete water troughs - 2' x 12' | \$440 to \$460 |
| Concrete water troughs - 2' x 16' | \$490 to \$595 |
| Mineral troughs - 20'             | \$165 to \$195 |

### CORRAL SHADES

|                                      | Per Square Foot  |
|--------------------------------------|------------------|
| Pipe poles, wood frame, metal cover  | \$2.20 to \$2.45 |
| Pipe poles, steel frame, metal cover | \$2.45 to \$2.95 |

### WATER LINES

|                |                         |
|----------------|-------------------------|
| 2" Water line  | \$2.35 per linear foot  |
| 3" Water line  | \$2.60 per linear foot  |
| 12" Flush line | \$12.60 per linear foot |
| 18" Drain line | \$22.00 per linear foot |
| Flush valves   | \$1,575 each            |
| Drain boxes    | \$1,680 each            |

## DAIRY BARNS

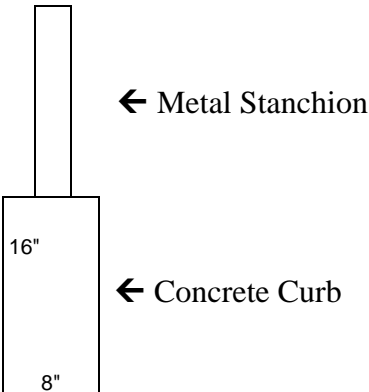
### SEPTIC TANKS

|                                 |                    |
|---------------------------------|--------------------|
| 1,000 – 1,500 gallon with lines | \$3,675 to \$4,200 |
| Cistern - per gallon            | \$.65 to \$.70     |

### BARN FANS

|                                     |                               |
|-------------------------------------|-------------------------------|
| With misters and automatic controls | \$735 to \$945 each—installed |
|-------------------------------------|-------------------------------|

### FEEDLANE STANCHIONS WITH CURB

|  |   |
|--|---|
| <p>Galvanized stanchions, 5-hole/10'</p> <p>Cow-type self-locking with release</p> <p>with 2 7/8" post in 8" x 16" concrete curb</p> <p>Cost Per Linear Foot: <b>\$33.90 to \$35.50</b>, stanchion and curb only</p> <p>Additional concrete</p> <p>Drivelane 6" reinforced - <b>\$2.50 to \$3.05</b> per sq. ft.</p> <p>Walklane 4" concrete - <b>\$2.10 to \$2.35</b> per sq. ft.</p> <p>Flush curb 8" x 8" - <b>\$4.00</b> per linear foot</p> |  |
| <p>Cow lane 12' wide with locking stanchions and stanchion curb and 10' feed lane</p>  | <p><b>\$84.00 to \$86.00</b> per linear foot</p>                                    |

*(Photograph shown on AH 534.20, page 25)*

### SILAGE PITS

Tilt-up of 6" concrete or 8" reinforced concrete block, 8' high, and enclosed on three sides with 6" concrete slabs.

| <u>Size</u> | <u>Price Per Square Foot</u> |
|-------------|------------------------------|
| 75 x 100    | \$4.80                       |
| 100 x 200   | \$4.00                       |
| 100 x 300   | \$3.80                       |

Concrete Silage Slab Only

5 1/2" to 6" reinforced with footings - **\$2.60 to \$3.00** with footings

6" rebar reinforced with footings - **\$3.10 to \$3.50**

*(Photograph shown on AH 534.20, page 25)*

# DAIRY BARNS

## LIQUID MANURE SYSTEMS (MANURE SEPARATOR)

Cost includes tanks, pumps, screens, valves, pipes, sump, and drainage system, but excludes cost of all holding ponds or lagoons. Typically one unit per 800 to 1,000 cows. **\$42,000 to \$55,000**

*(Drawing shown on AH 534.20, page 26)*

## STEEL BULK FEED TANKS ON CONCRETE PAD WITH HOPPER BOTTOM

| <u>Components</u> | <u>Cost</u> |
|-------------------|-------------|
| 5 Ton             | \$1,980     |
| 9 Ton             | 2,750       |
| 10.5 Ton          | 2,700       |
| 13 Ton            | 3,300       |
| 15 Ton            | 3,900       |
| 20 Ton            | 4,750       |
| 25 Ton            | 5,180       |
| 31 Ton            | 6,260       |
| 34 Ton            | 6,300       |
| 40 Ton            | 7,140       |
| 45 Ton            | 8,190       |
| 60 Ton            | 9,000       |

*(Photographs shown on AH 534.20, page 27)*

## ADDITIVES AND ACCESSORIES

|                                |                |
|--------------------------------|----------------|
| Feeder lines (Per linear foot) | \$7.00         |
| Partition                      | \$3.10         |
| Ladder                         | \$205 to \$255 |
| Augar                          | \$305 to \$405 |

# DAIRY BARNS

## GRADE "B" BARNS

Use upper end of cost range for Sacramento Valley and north

### MILK HOUSE

|                         |   |
|-------------------------|---|
| Foundation              | Concrete  |
| Floors                  | Concrete slab   |
| Walls                   | 6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above |
| Roof                    | Average wood frame, corrugated iron, or aluminum cover                    |
| Windows                 | Metal sash or metal louvers, 5 percent of wall area                       |
| Interior                | Smooth finish plaster   |
| Electrical              | Fair fixtures   |
| Plumbing                | One wash basin  |
| <b>Square-Foot Cost</b> | <b>\$39.00 to \$54.00</b> per square foot (including breezeway)           |

### MILKING BARNS

|                          |   |
|--------------------------|---|
| Foundation               | Light concrete  |
| Floors                   | Concrete—cow stands   |
| Walls                    | Box frame, 4" x 6"—10' on center                                      |
| Roof                     | Average wood frame, wood shingles, corrugated iron, or aluminum cover |
| Windows                  | Barn sash   |
| Interior                 | Unfinished  |
| Electrical               | None  |
| Plumbing                 | None  |
| Stanchions               | Wood stanchions   |
| <b>Square-Foot Costs</b> | <b>\$16.50 to \$20.90</b> per square foot                             |

Building costs do not include milking equipment

*(Drawing with labels shown on AH 534.20, page 28)*

# DAIRY BARNS

## STANCHION BARNS

High end of range in cost is for Sacramento and Northern California

### MILK, WASH, AND EQUIPMENT ROOMS

|                         |   |
|-------------------------|---|
| Foundation              | Reinforced concrete   |
| Floors                  | Concrete slab   |
| Walls                   | 6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above |
| Roof                    | Average wood frame, corrugated iron, or aluminum cover                    |
| Windows                 | Metal sash or metal louvers, 10 percent of wall area                      |
| Interior                | Smooth finish plaster—cove base   |
| Electrical              | Conduit—average fixtures  |
| Plumbing                | One wash basin—usual floor drains   |
| <b>Square-Foot Cost</b> | <b>\$41.00 to \$49.60</b> per square foot (including breezeway)           |

### MILKING BARNS

|                         |   |
|-------------------------|---|
| Foundation              | Reinforced concrete   |
| Floors                  | Concrete—well-formed gutters and mangers                                  |
| Walls                   | 6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above |
| Roof                    | Average wood frame, corrugated iron, or aluminum cover                    |
| Windows                 | Metal sash or metal louvers   |
| Interior                | Smooth plaster 36" high   |
| Electrical              | Conduit—average fixtures  |
| Plumbing                | Usual floor drains and hose bibs  |
| Stanchions              | Metal stanchions  |
| <b>Square-Foot Cost</b> | <b>\$41.00 to \$49.00</b> per square foot                                 |

### FEED ROOM

|                         |  |
|-------------------------|--|
| Foundation              | Reinforced concrete                                    |
| Floors                  | Concrete slab  |
| Walls                   | 2" x 4" or 2" x 6"—16" on center framing               |
| Roof                    | Average wood frame, corrugated iron, or aluminum cover |
| Windows                 | None   |
| Interior                | Unfinished   |
| Electrical              | Conduit—average fixtures                               |
| Plumbing                | None   |
| <b>Square-Foot Cost</b> | <b>\$16.00 to \$27.00</b> per square foot              |

Building costs do not include milking equipment

*(Drawing with labels and descriptions shown on AH 534.20, page 29)*



# DAIRY BARNS

## WALK-THROUGH TYPE BARNS

High end of the range in cost is for Sacramento and Northern California

### MILK, WASH, AND EQUIPMENT ROOMS

|                         |   |
|-------------------------|---|
| Foundation              | Reinforced concrete   |
| Floors                  | Concrete slab   |
| Walls                   | 6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above or all concrete block |
| Roof                    | Average wood frame, corrugated iron, or aluminum cover  |
| Windows                 | Metal sash or metal louvers, 10 percent of wall area  |
| Interior                | Smooth finish plaster—cove base   |
| Electrical              | Conduit—average fixtures  |
| Plumbing                | One wash basin—usual floor drains   |
| <b>Square-Foot Cost</b> | <b>\$34.50 to \$36.75</b> per square foot (including breezeway)                                 |

### MILKING BARNS

|                         |  |
|-------------------------|--|
| Foundation              | Reinforced concrete  |
| Floors                  | Concrete—well-formed gutters and mangers   |
| Walls                   | 6" or 8" concrete block 36" high with 2" x 4"—16" on center framing above, or all concrete block |
| Roof                    | Average wood frame, corrugated iron, or aluminum cover   |
| Windows                 | Metal sash or metal louvers  |
| Interior                | Smooth plaster 36" high  |
| Electrical              | Conduit—average fixtures   |
| Plumbing                | Usual floor drains and hose bibs   |
| Stanchions              | Metal stanchions   |
| <b>Square-Foot Cost</b> | <b>\$31.50 to \$34.50</b> per square foot  |

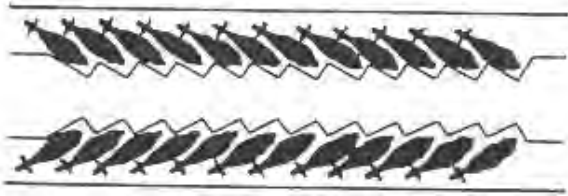
Building costs do not include milking equipment

*(Drawing with labels and descriptions shown on AH 534.20, page 30)*

# DAIRY BARNS

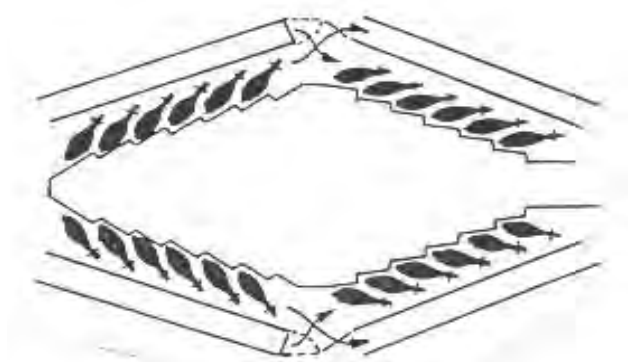
## COMMONLY USED MILKING PARLORS

### HERRINGBONE (DOUBLE 12)



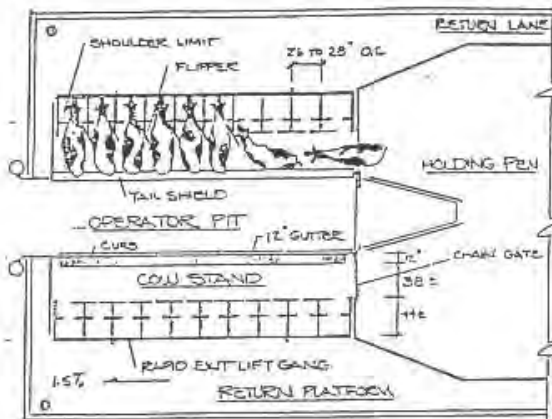
All cows on either side of the pit enter and leave as a group. Newer parlors may have 20 to 30 cows to a side. Some have rapid exit group side release.

### POLYGON



Each of the four sides has separate group entry and exit. Usually each side is a herringbone configuration, but can have angle modifications.

### PARALLEL (DOUBLE 10)

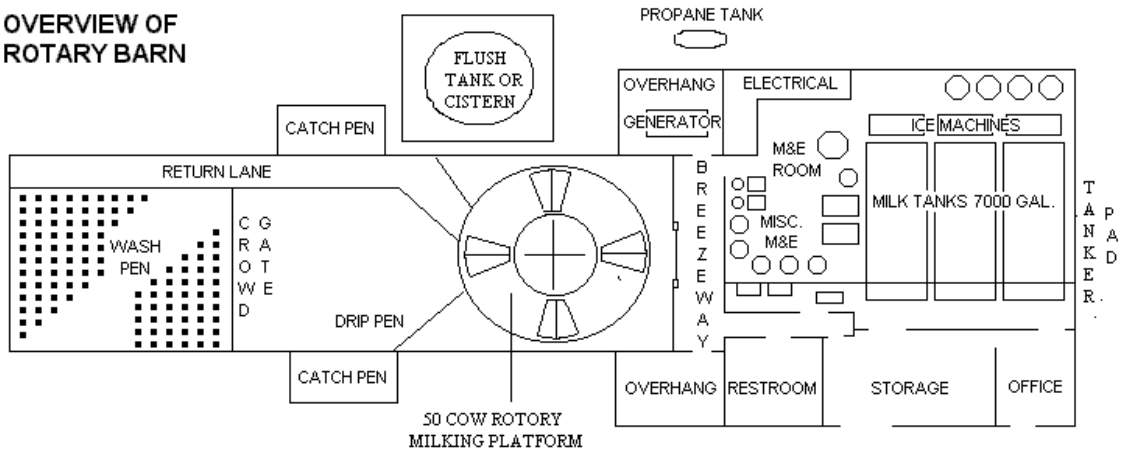


In this design, cows are milked from the rear, rather than the side. Thus, more cows can be milked in a given space than with other designs. Usually a rapid gang exit is present. Typical size is a double 20' to 30'.

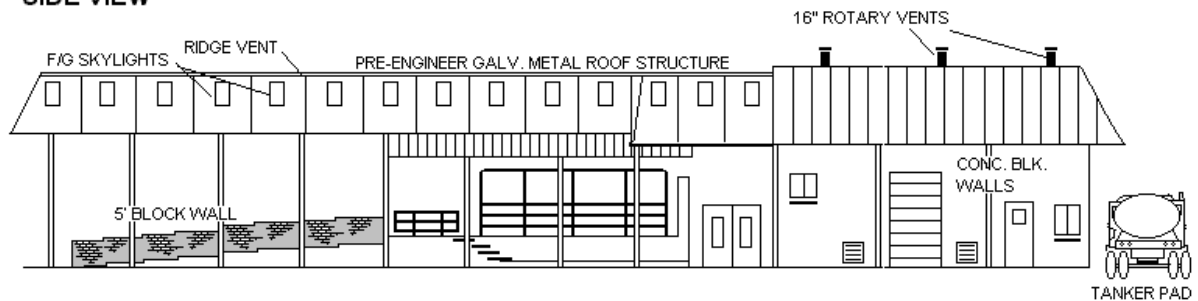
# DAIRY BARNS

## 50-COW ROTARY BARN

### OVERVIEW OF ROTARY BARN



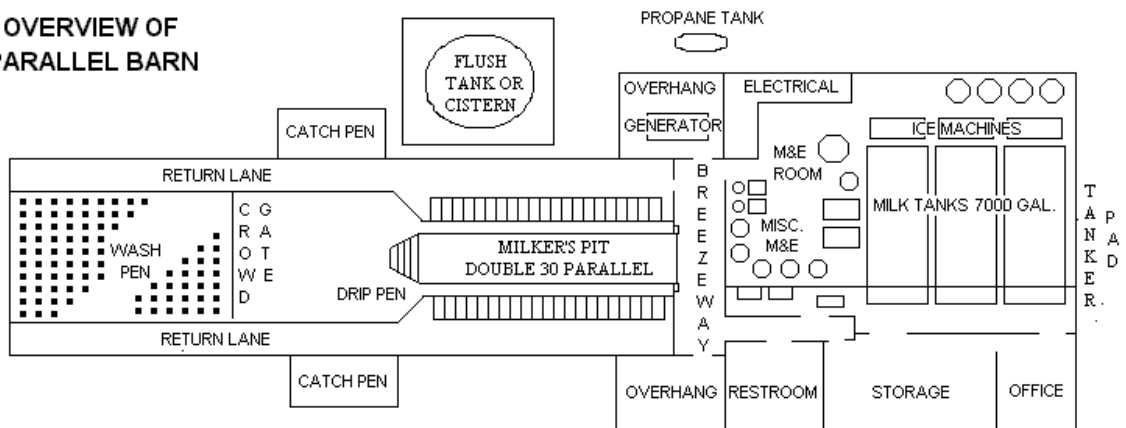
### SIDE VIEW



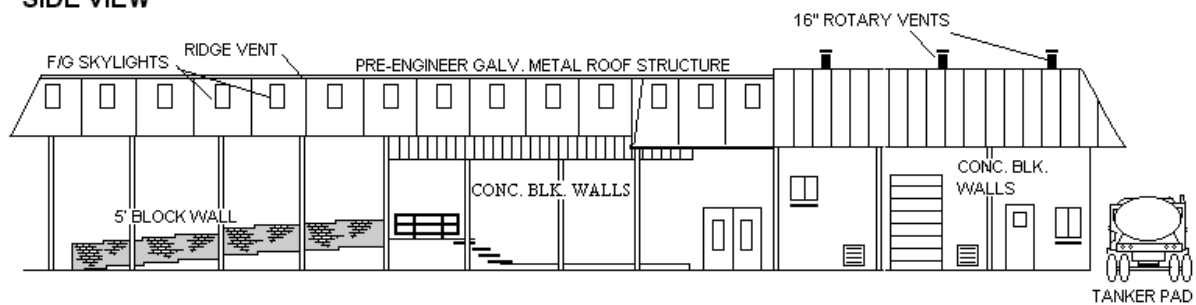
# DAIRY BARNS

## DOUBLE 30 PARALLEL BARN

OVERVIEW OF  
PARALLEL BARN



SIDE VIEW



# DAIRY BARNS

## 50-COW ROTARY MILKING PARLOR



# DAIRY BARNS

## EXTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY



Equipment, office, milk room



# DAIRY BARNS

## INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY



# DAIRY BARNS

## INTERIOR MODERN HERRINGBONE, PARALLEL, OR ROTARY





# DAIRY BARNS

## HOLDING, WASH, AND DRIP AREA EQUIPMENT

Wash Pen



# DAIRY BARNS

## FREESTALL BARN



# DAIRY BARNS

## HOSPITAL BARN



## Commodity Barn



# DAIRY BARNS

## HAY BARNS



# DAIRY BARNS

## MISCELLANEOUS



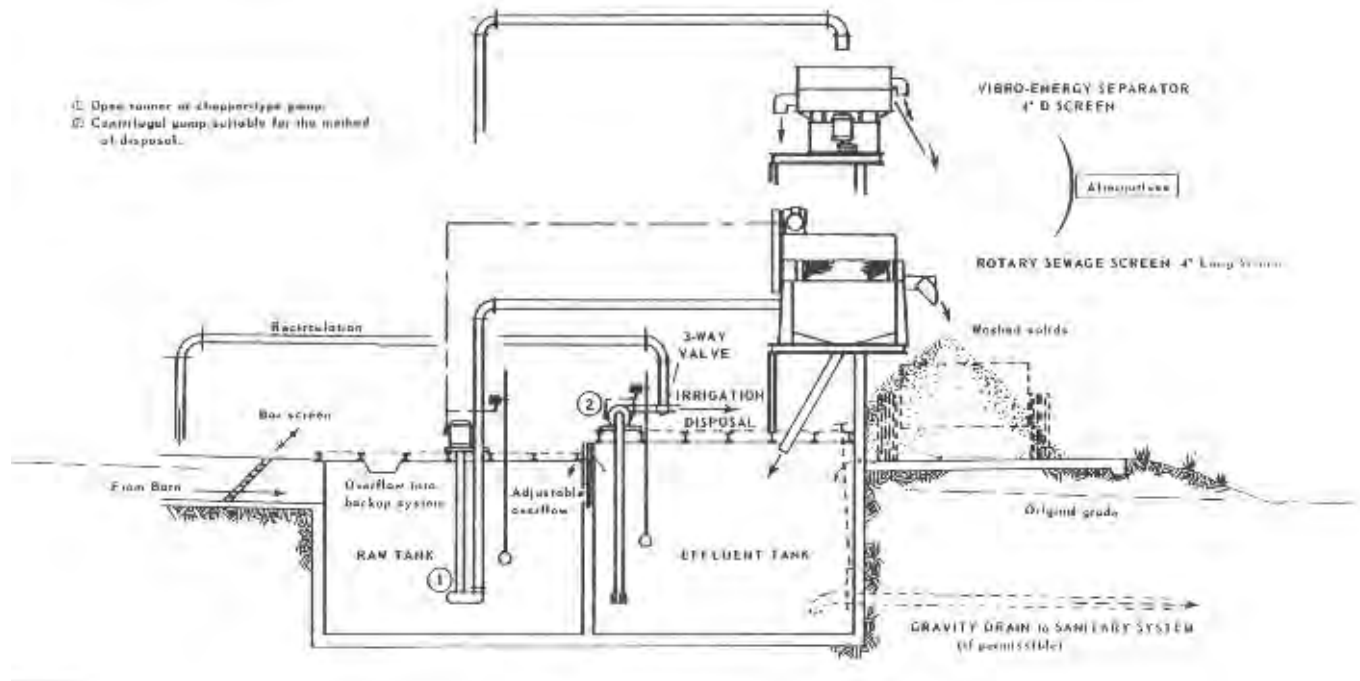
Feedlane Stanchions



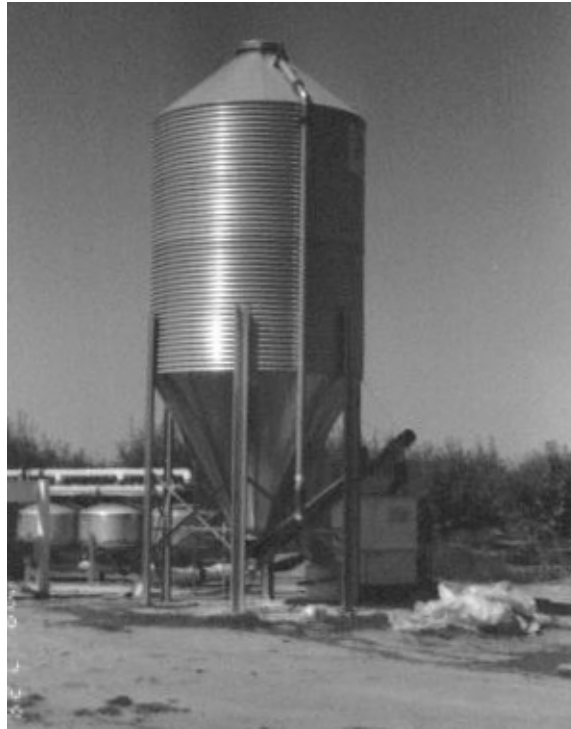
Silage Pits

# DAIRY BARNS

## LIQUID MANURE SYSTEMS (MANURE SEPARATOR)



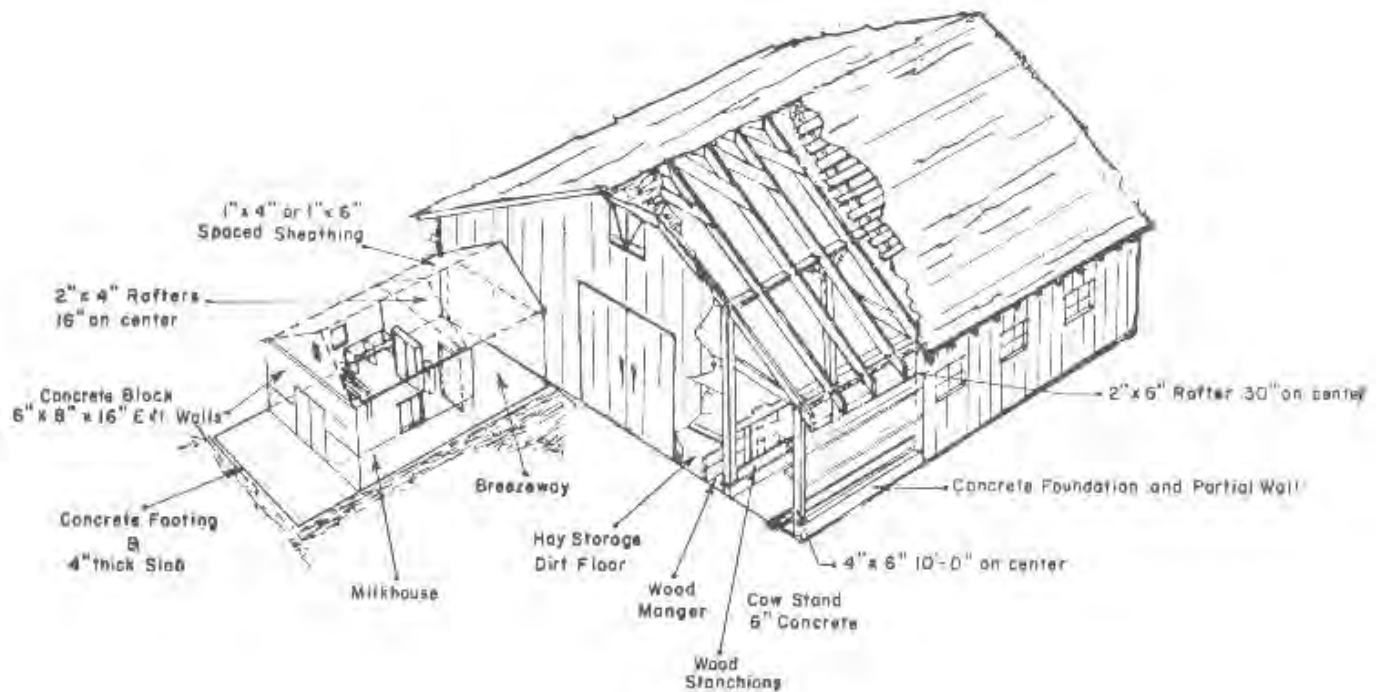
## DAIRY BARNS



Steel Bulk Feed Tanks on Concrete Pad with Hopper Bottom

# DAIRY BARNS

## GRADE "B" BARN

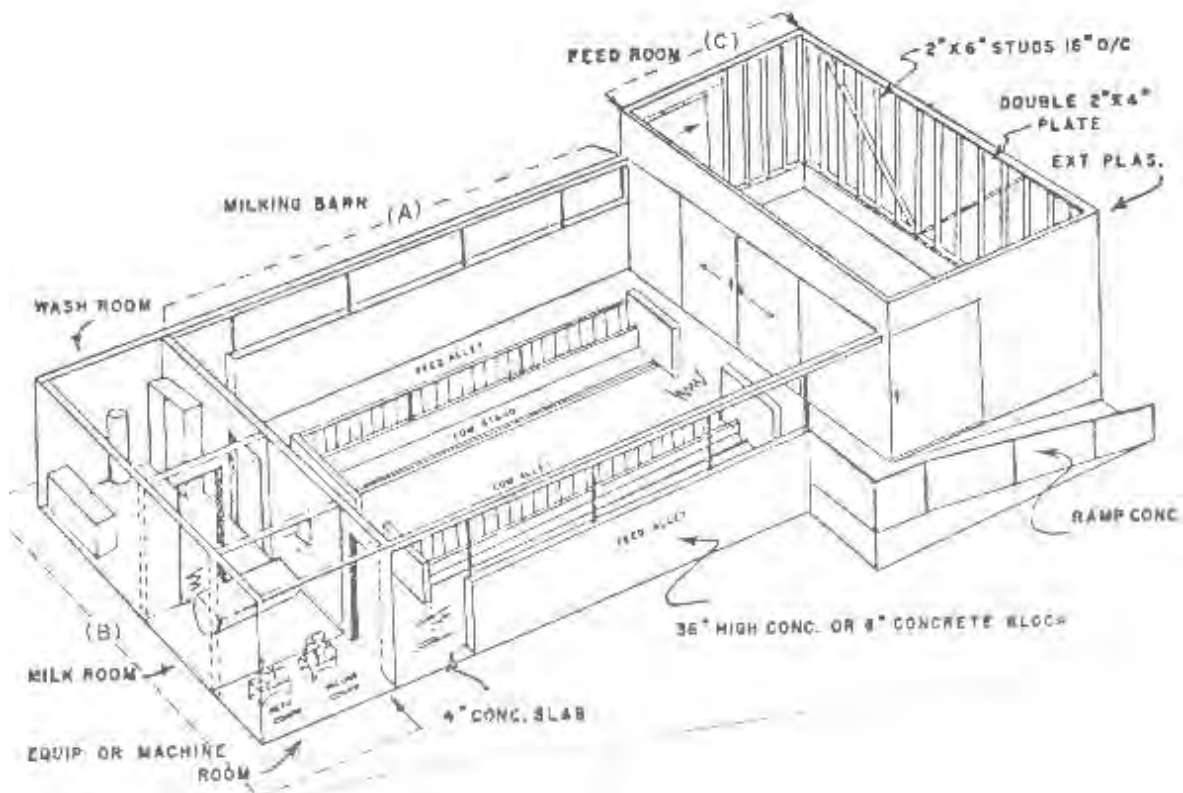


TYPICAL GRADE "B" DAIRY BARN



# DAIRY BARNS

## STANCHION BARNS



### Component Parts of This Dairy

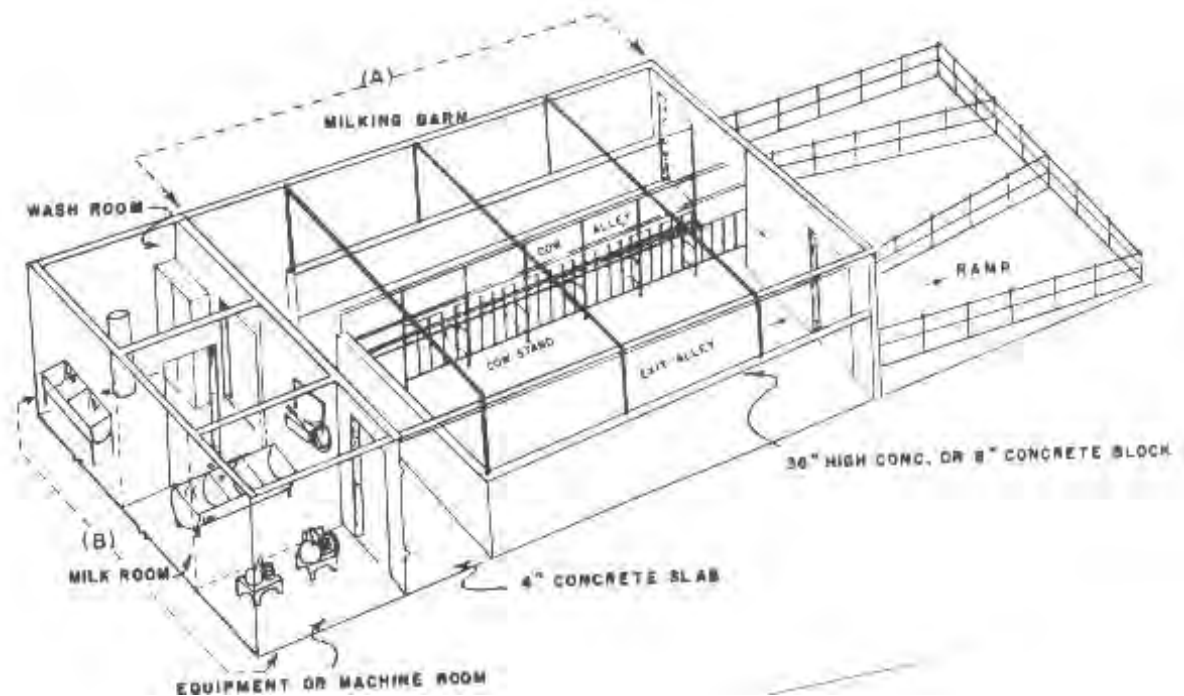
- A. Milking Barn
- B. Feed Room
- C. Milk, Wash, and Equipment Rooms

## TYPICAL STANCHION BARN

# DAIRY BARNS

## WALK-THROUGH TYPE

### TYPICAL WALK-THROUGH BARN



Component Parts of This Dairy

- A. Milking Barn
- B. Milk, Wash, and Equipment Rooms

## AH 534.30: POULTRY HOUSES

This chapter contains specifications and costs for poultry structures and equipment for modern controlled environment houses. Drawings showing examples of the buildings discussed are located at the end of this chapter.

### MODERN CONTROLLED ENVIRONMENT HOUSES—GOOD QUALITY

|                     |  |
|---------------------|--|
| Foundation          | Concrete                                   |
| Floor               | Concrete slab                              |
| Wall Frame          | Heavy steel beam, 20' to 22' to eave       |
| Roof Frame          | Steel truss and steel purlins, insulated   |
| Exterior            | 26-gauge steel panels with R-11 insulation |
| Lighting            | Good quality lighting                      |
| Plumbing            | Good plumbing                              |
| Basic Building Cost | <b>\$26.50 to \$28.00</b> per square foot  |

Typical Size 80' x 400'

Basic building costs are for building only and include only those components specified. The cost of all items of equipment such as cages, drinking water systems, fogging systems, feeding systems, egg-gathering systems, heating and cooling systems, etc., must be added to the basic building cost to arrive at total cost.

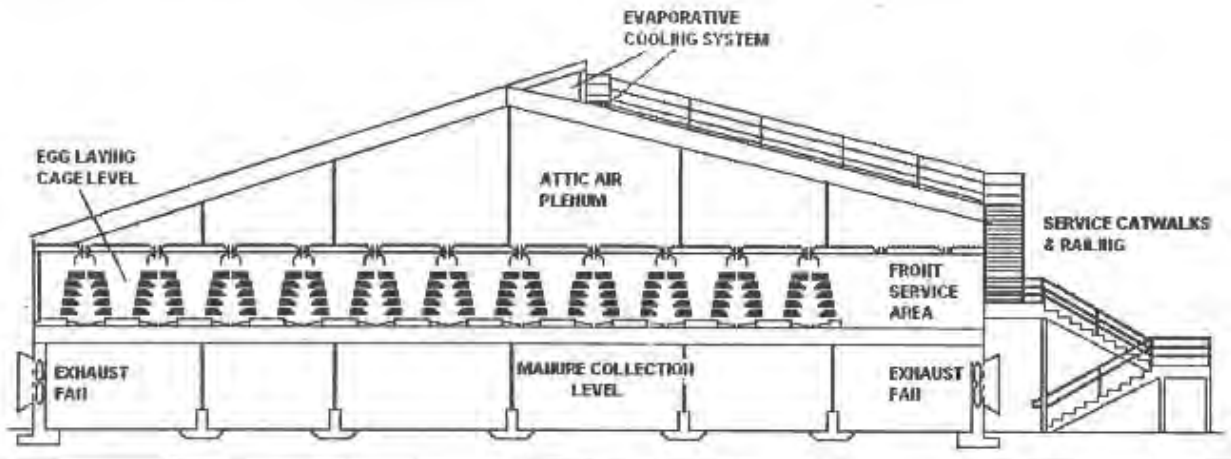
*(Drawing shown on AH 534.30, page 2)*

### EQUIPMENT - MODERN CONTROLLED ENVIRONMENT HOUSES

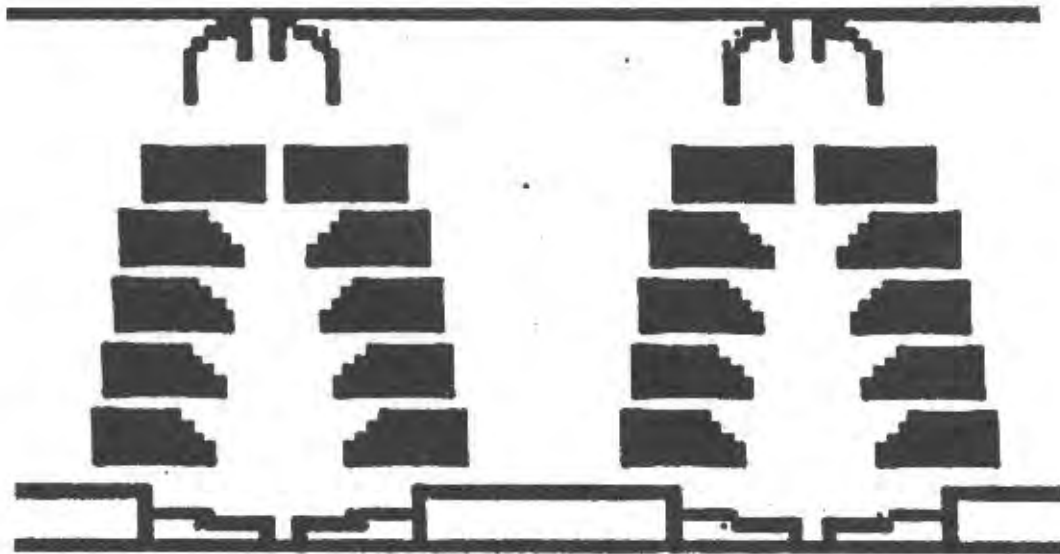
| Components                           | A-Frame Cages                    |
|--------------------------------------|----------------------------------|
| Cages                                | 5 tier                           |
| Watering System                      | Automatic nipple system          |
| Feeding System                       | Automatic auger system           |
| Egg-Gathering System                 | Automatic                        |
| Cooling                              | Pad and fan system               |
| Heating                              | None                             |
| <b>Total Cost Per Bird Equipment</b> | <b>\$7.25 to \$8.25</b> per bird |

*(Drawing shown on AH 534.30, page 2)*

# POULTRY HOUSES



TYPICAL CROSS SECTION



A-FRAME CAGE SYSTEM

## AH:534.61: IRRIGATION SYSTEMS

This chapter contains specifications and costs for various irrigations systems, including:

- Concrete pipe
- PVC pipe
- Aluminum pipe
- Irrigation valves
- Permanent irrigation system
- Concrete ditch

Photographs showing examples of systems discussed are located at the end of this chapter.

The following costs for irrigation system components have been derived from information gathered, for the most part, in the San Joaquin and Sacramento Valleys. Costs have been collected for only the more widely used components. Many areas will have types of equipment not usually found in other locations. Costs for those items or systems should be checked locally.

### CONCRETE PIPE - INSTALLED

| Size in Inches | Cost Installed Per Linear Foot |                  | Vertical Stand Pipe Including Base Installed Cost Per Foot of Height |                  |
|----------------|--------------------------------|------------------|--|------------------|
|                | Fresno Area                    | Sacramento North | Fresno Area  | Sacramento North |
| 8              | \$7.75                         | \$8.00           | \$19.65  | \$20.15          |
| 10             | 8.00                           | 8.50             | 23.95  | 24.25            |
| 12             | 8.90                           | 9.00             | 25.10  | 26.00            |
| 14             | 9.80                           | 9.75             | 27.30  | 28.85            |
| 16             | 10.90                          | 10.90            | 42.50  | 43.45            |
| 18             | 11.65                          | 11.60            | 48.00  | 48.95            |
| 20             | 14.15                          | 14.15            | 49.10  | 51.00            |
| 24             | 21.80                          | 23.30            | 87.15  | 88.70            |
| 30             | 54.60                          | 55.05            | 152.25   | 155.00           |
| 36             | 70.85                          |                  | 169.05   | 168.30           |
| 42             |                                |                  | 239.40   | 239.70           |
| 48             |                                |                  | 338.10   | 339.65           |

The above prices are for installations over 700 feet in length. Adjust the above prices for installations less than 700 feet by using an appropriate dollar figure from the next page.

# IRRIGATION SYSTEMS

## CONCRETE PIPE - INSTALLED

Adjust the prices from the previous page for installations less than 700 feet by the following amount.

| <u>Length of Pipe</u> | <u>Add to All Sizes</u> |
|-----------------------|-------------------------|
| Up to 100'            | \$7.15 per foot         |
| 100' to 200'          | 5.60 per foot           |
| 200' to 300'          | 4.65 per foot           |
| 300' to 400'          | 3.05 per foot           |
| 400' to 500'          | 2.55 per foot           |
| 500' to 600'          | 2.05 per foot           |
| 600' to 700'          | 1.50 per foot           |

### PRESSURE BOXES (Reinforced concrete with capped top)

| Size | Price Per Linear Foot of Height |
|------|---------------------------------|
| 24"  | \$365                           |
| 30"  | 509                             |
| 36"  | 633                             |

### STAND PIPE INCLUDING THE BASE

| Size | 6'    | 9'     | 12'     | 15'     |
|------|-------|--------|---------|---------|
| 24"  | \$523 | \$ 784 | \$1,045 | \$1,307 |
| 30"  | 913   | 1,370  | 1,827   | 2,283   |
| 36"  | 1,014 | 1,522  | 2,028   | 2,535   |
| 42"  | 2,066 | 2,154  | 2,872   | 3,591   |
| 48"  | 2,075 | 3,042  | 4,057   | 5,071   |

### VENT PIPE—PLASTIC

| Size | 9' Height Limit |
|------|-----------------|
| 2"   | \$12 per foot   |
| 3"   | 13 per foot     |
| 4"   | 17 per foot     |

# IRRIGATION SYSTEMS

## CONCRETE PIPE - INSTALLED

### VENT PIPE—STEEL

| Size | 9' Height Limit |
|------|-----------------|
| 2"   | \$14 per foot   |
| 4"   | 20 per foot     |
| 6"   | 24 per foot     |
| 8"   | 31 per foot     |
| 10"  | 39 per foot     |
| 12"  | 43 per foot     |

**ADD HOOK-UP** (When new concrete pipe is connected to old concrete pipe, add the following)

| Size              | Add   |
|-------------------|-------|
| 8", 10", and 12"  | \$262 |
| 14", 16", and 18" | 315   |
| 20" and 24"       | 367   |

## PVC PIPE

Cost includes components and installation, but not hook-up to pump. As pressure requirements rise, the pipe becomes more costly.

### PVC PIPE—INSTALLED (PER LINEAR FOOT)

| Size | Class 63<br>Low Head (Flood) | 100 P S I (Sprinkler) |
|------|------------------------------|-----------------------|
| 6"   | \$4.30                       | \$5.70                |
| 8"   | 5.50                         | 7.00                  |
| 10"  | 8.25                         | 9.70                  |
| 12"  | 11.00                        | 12.90                 |
| 15"  | 15.40                        | 17.15                 |
| 18"  | 22.00                        | 23.90                 |

PVC hook-up to pump—includes relief valves, check valves, dresser couplings, elbows, and labor.

# IRRIGATION SYSTEMS

## PVC PIPE

### ADD HOOK-UP

| Size | Cost   |
|------|--------|
| 6"   | \$ 848 |
| 8"   | 1,270  |
| 10"  | 1,695  |
| 12"  | 2,225  |

### VALVE, SADDLE, AND RISER (FOR SURFACE LATERALS)

| Size | Sprinkler | Flood |
|------|-----------|-------|
| 4"   | \$ 82     | \$114 |
| 8"   | -         | 197   |
| 10"  | -         | 244   |
| 12"  | -         | 415   |
| 14"  | -         | 500   |

## ALUMINUM PIPE

Aluminum pipe costs include sales tax, but exclude installation costs due to their portable nature.

| Main Lines Per Linear Foot      | Diameter |        |        |        |
|---------------------------------|----------|--------|--------|--------|
|                                 | 6"       | 8"     | 10"    | 12"    |
| Ring Lock Type                  |          |        |        |        |
| 40' joints <u>without</u> valve | \$4.25   | \$5.60 | \$6.50 | \$7.65 |
| 40' joints <u>with</u> valve    | 4.70     | 6.60   | 7.70   | 9.10   |
| Latch Type                      | 3"       | 4"     | 6"     |        |
| 30' joints <u>without</u> valve | \$1.30   | \$2.20 | \$3.15 |        |

## SPRINKLER LINES

18" Risers—30' lengths      3"—\$**1.75** per linear foot      4"—\$**2.40** per linear foot



# IRRIGATION SYSTEMS

## GALVANIZED FITTINGS

| Valve Openers |       | End Plugs |      | 90° Elbows |       |
|---------------|-------|-----------|------|------------|-------|
| Size          | Cost  | Size      | Cost | Size       | Cost  |
| 4"            | \$150 | 6"        | \$40 | 6"         | \$ 76 |
| 6"            | 180   | 8"        | 55   | 8"         | 100   |
| 8"            | 250   | 10"       | 80   | 10"        | 140   |

## IRRIGATION VALVES

Flood valves are set near the top or flush on top of a concrete pipe riser. Several types are in general use, i.e., Yakima and Alfalfa. They are made with either a solid arch or a removable arch. The removable arch type is more expensive, but it allows for replacement of the arch without complete valve removal when breakage occurs. The solid arch is usually found to be a Yakima and the removable arch is an Alfalfa.

## FLOOD VALVES

| Size in Inches | Solid Arch Yakima | Size in Inches | Alfalfa |
|----------------|-------------------|----------------|---------|
| 3 x 8          | \$ 88             |                |         |
| 4 x 8          | 91                | 8 x 8          | \$198   |
| 5 x 8          | 99                | 10 x 10        | 250     |
| 6 x 10         | 125               | 12 x 12        | 300     |
| 8 x 12         | 156               | 14 x 14        | 355     |
| 10 x 14        | 208               |                |         |
| 12 x 16        | 255               |                |         |
| 14 x 18        | 315               |                |         |
| 16 x 20        | 490               |                |         |
| 18 x 20        | 520               |                |         |
| 20 x 20        | 630               |                |         |

*(Photographs shown on AH 534.61, page 12)*

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

### OVERFLOW VALVES

| Size in Inches | Cost Installed |
|----------------|----------------|
| 3 x 8          | \$ 85          |
| 3 1/2 x 8      | 85             |
| 4 x 8          | 87             |
| 5 x 8          | 97             |
| 5 x 10         | 97             |
| 6 x 10         | 131            |
| 6 1/2 x 10     | 131            |
| 8 x 12         | 155            |
| 10 x 14        | 220            |
| 12 x 16        | 283            |
| 14 x 18        | 350            |
| 16 x 20        | 504            |
| 18 x 20        | 625            |
| 20 x 24        | 782            |

The orchard valve is a solid arch set down in a riser. Although it is generally used in orchards, it may also be found in row crops and pastures.

### PVC ORCHARD VALVE

| Valve Size | Riser Size | Cost  |
|------------|------------|-------|
| 3 1/2"     | 8"         | \$ 82 |
| 4"         | 8"         | 103   |
| 5"         | 8"         | 103   |
| 6"         | 10"        | 132   |
| 6 1/2"     | 10"        | 132   |
| 8"         | 12"        | 157   |
| 10"        | 14"        | 220   |
| 12"        | 16"        | 278   |
| 14"        | 18"        | 327   |
| 16"        | 20"        | 488   |
| 18"        | 21"        | 598   |
| 20"        | 24"        | 730   |

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

The vineyard valve is a modification of the orchard valve. The riser is pierced with two or more small galvanized tubes which have small sliding galvanized gates. This arrangement allows a choice of direction and volume of water flow. This valve is found mainly in the Central San Joaquin Valley.

### VINEYARD VALVE

| Valve Size | Riser Size | Number of Gates | Gate Size | Cost Installed |
|------------|------------|-----------------|-----------|----------------|
| 3 1/2"     | 8"         | 2               | 2"        | \$ 83          |
| 3 1/2"     | 8"         | 2               | 2 1/2"    | 86             |
| 3 1/2"     | 8"         | 2               | 3"        | 91             |
| 3 1/2"     | 8"         | 3               | 2"        | 93             |
| 3 1/2"     | 10"        | 2               | 2"        | 89             |
| 3 1/2"     | 10"        | 2               | 2 1/2"    | 90             |
| 3 1/2"     | 10"        | 2               | 3"        | 90             |
| 4"         | 8"         | 2               | 2"        | 91             |
| 4"         | 8"         | 2               | 2 1/2"    | 92             |
| 4"         | 8"         | 2               | 3"        | 96             |
| 4"         | 10"        | 2               | 2"        | 93             |
| 4"         | 10"        | 2               | 2 1/2"    | 95             |
| 4"         | 10"        | 2               | 3"        | 101            |
| 4"         | 10"        | 3               | 2"        | 99             |
| 4"         | 10"        | 4               | 2"        | 103            |
| 5"         | 10"        | 4               | 2"        | 125            |
| 5"         | 12"        | 2               | 3"        | 122            |
| 6"         | 10"        | 2               | 3"        | 109            |
| 6"         | 10"        | 4               | 3"        | 125            |
| 6"         | 12"        | 2               | 3"        | 130            |
| 6"         | 12"        | 2               | 4"        | 137            |

# IRRIGATION SYSTEMS

## IRRIGATION VALVES

Gate valves have different designs depending on the use. The canal gate is for general low-pressure uses as canal discharges, pressure pipelines, etc. The screw-pressure gate is a high-pressure gate valve used for reservoirs, etc. The hub-end gate is designed for use in pipelines.

### GATE VALVES

| Size in Inches | Screw Pressure | Canal Gate | Hub-End Gate | Clamp Gate | Baxter Gate | Galvanized Gate |
|----------------|----------------|------------|--------------|------------|-------------|-----------------|
| 6              |                |            |              |            |             | \$ 85           |
| 8              | \$ 650         |            | \$1,120      | \$470      |             | 115             |
| 10             | 750            | \$ 750     | 1,410        | 730        |             | 125             |
| 12             | 850            | 810        | 1,530        | 780        | \$1,250     | 145             |
| 14             | 1,090          | 970        | 1,920        | 1,040      |             | 175             |
| 16             | 1,750          | 1,140      | 2,340        | 1,250      | 1,560       | 205             |
| 18             | 2,390          | 1,300      | 3,010        |            |             | 225             |
| 20             | 2,700          | 1,450      | 3,540        |            |             | 250             |
| 24             | 3,100          | 1,970      |              |            |             | 345             |

*(Photographs shown on AH 534.61, page 12)*

Capped riser irrigation systems are generally found in old orange groves. The galvanized gates are diamond shaped.

### CAPPED RISERS

| Size | Number of Gates | Size of Gates | Installed Cost |
|------|-----------------|---------------|----------------|
| 8"   | 2               | 2"            | \$44           |
| 8"   | 3               | 1"            | 45             |
| 8"   | 4               | 1"            | 51             |

### AIR RELIEF VALVES

| Size | Installed on PVC | Installed on Concrete Pipe |
|------|------------------|----------------------------|
| 2"   | \$130            | \$150                      |
| 3"   | 215              | 240                        |
| 4"   | 275              | 350                        |

# IRRIGATION SYSTEMS

## PERMANENT IRRIGATION SYSTEM

The larger set-ups are at lower end of range

### SPRINKLERS— "SOLID SET"—UNDER TREES

| Type                                   | Cost Per Acre   |
|--|-----------------|
| Manual system                          | \$ 900 to 1,200 |
| Automatic system                       | 1,000 to 1,500  |
| Frost protection system                | 1,000 to 1,500  |
| Automatic system with frost protection | 1,400 to 1,800  |

PVC underground lines, 12" risers, impulse heads, sand filter

### SPRINKLERS—"SOLID SET"—OVER VINES

| Type                                   | Cost Per Acre      |
|--|--------------------|
| Manual system                          | \$1,040 to \$1,248 |
| Automatic system                       | \$1,040 to \$1,350 |
| Frost protection system                | \$1,870 to \$2,600 |
| Automatic system with frost protection | \$2,185 to \$3,225 |

PVC underground lines, 6" risers, impulse heads, sand filter

### DRIP SYSTEM—ORCHARD

| Type                                    | Cost Per Acre      |
|---|--------------------|
| New planting (1 to 4 emitters per tree) | \$1,005 to \$1,695 |
| Mature orchard (4 emitters per tree)    | \$1,165 to \$1,905 |

### DRIP SYSTEM—VINEYARD

| Type   | Cost Per Acre      | Total Cost         |
|--|--------------------|--------------------|
| Ratio of cost—70 percent above ground, 30 percent below ground, add    | \$1,270 to \$1,900 |                    |
| Elaborate sand filters (for dirty water-aqueduct and river water), add | \$210 to \$320     |                    |
| Fertilizer application equipment, add                                  |                    | \$800 to \$950     |
| When proportion pumps are used, add                                    |                    | \$1,450 to \$2,330 |

The linear overhead sprinkler system is used on a level parcel usually a one-half section of land. A concrete ditch runs through the parcel as a water supply. This type of irrigation system costs between **\$740 to \$875** per acre. The linear drive machine costs **\$143,000 to \$169,000**.

*(Photographs shown on AH 534.61, page 13 and 14))*

# IRRIGATION SYSTEMS

## PERMANENT IRRIGATION SYSTEM

### PULL HOSE SYSTEM

| Type                 | Cost Per Acre  |
|----------------------|----------------|
| Plus pump and filter | \$550 to \$700 |

### ELECTRIC CENTER PIVOT SPRINKLER—Including concrete base

| Size   | Cost Each            |
|--|----------------------|
| 160 acres (130 acres net)                    | \$48,000 to \$55,000 |
| 160 acres (130 acres net) – Used 12-15 years | \$20,000 to \$28,500 |

*(Photograph shown on AH 534.61, page 15)*

|                         |                                    |
|-------------------------|------------------------------------|
| Concrete Structures     | <b>\$400</b> per cubic yard        |
| Control Gates           | <b>\$200</b>                       |
| Hook-up and Connections | Between no charge and <b>\$240</b> |

### CRIBBINGS

| Size in Inches | Cost Per Linear Foot |
|----------------|----------------------|
| 24             | \$153                |
| 30             | 204                  |
| 36             | 224                  |

The concrete riser above the valve is cut in half to direct the flow of water

# IRRIGATION SYSTEMS

## CONCRETE DITCHES

Costs are for one-half to one mile runs. Shorter runs are a little higher.

| <u>Bottom</u> | <u>Depth</u> | <u>Cost Per Foot</u> |
|---------------|--------------|----------------------|
| 1'            | 16"          | \$8.00               |
| 1'            | 18"          | 8.25                 |
| 1'            | 20"          | 8.65                 |
| 1'            | 22"          | 9.15                 |
| 1'            | 24"          | 9.45                 |
| 1'            | 26"          | 9.95                 |
| 1'            | 28"          | 10.25                |
| 1'            | 30"          | 10.80                |
| 2'            | 24"          | 13.75                |
| 2'            | 27"          | 14.25                |
| 2'            | 30"          | 16.00                |
| 2'            | 34"          | 17.25                |
| 2'            | 36"          | 17.85                |
| 2'            | 38"          | 18.45                |
| 2'            | 40"          | 19.00                |
| 2'            | 42"          | 19.65                |
| 2'            | 44"          | 21.00                |
| 2'            | 46"          | 21.75                |
| 2'            | 48"          | 23.60                |

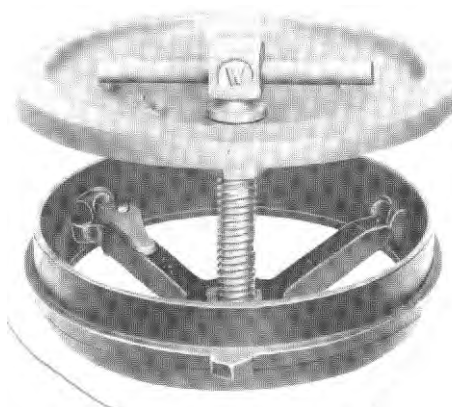
The above costs do not include end gates and turn out gates. They range from **\$112 to \$143** each (three joints 12" x 14" in diameter). Check gates cost **\$375**.

The above prices do include the land shaping.

# IRRIGATION SYSTEMS



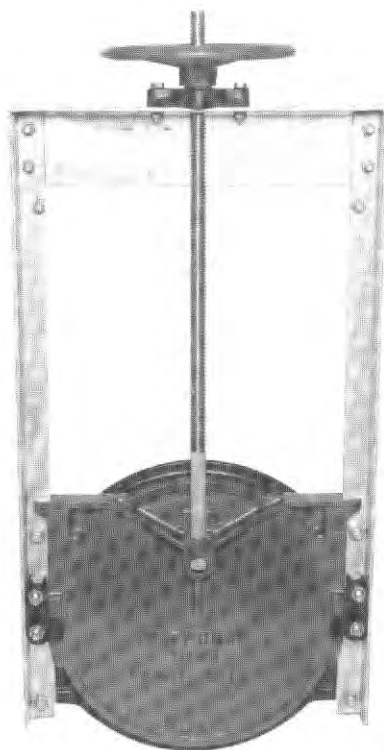
ALFAFA VALVE



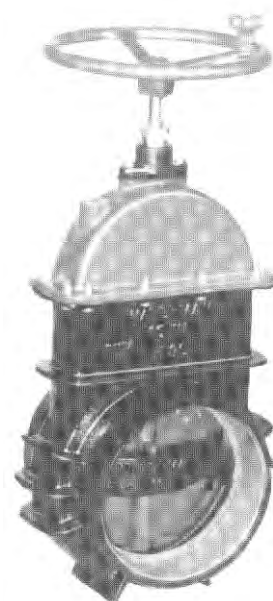
YAKIMA VALVE



PRESSURE SLIDE GATE



CANAL GATE



HUB END GATE



# IRRIGATION SYSTEMS



# IRRIGATION SYSTEMS



IN-LINE OVERHEAD SPRINKLER SYSTEM

# IRRIGATION SYSTEMS



PIVOTAL OVERHEAD SPRINKLER

## AH 534.62: PUMPS

This chapter contains specifications and costs for various pumps used with irrigation systems, including:

- Turbine pumps
- Diesel powered pumps
- Submersible pumps
- Wells
- Windmills

Photographs showing examples of the pumps discussed are shown at the end of this chapter.

### SAN JOAQUIN VALLEY BASE TURBINE PUMPS 3-PHASE FREE FLOW DISCHARGE

1,800 RPM, 5 to 350 HP installed, including pump complete in place with normal stages, power pole, pads, and control panel. Well and casing excluded.

| HP  | Depth of Setting |        |        |        |        |        |        |        |        |        |        |        |
|-----|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|     | 40'              | 60'    | 80'    | 100'   | 120'   | 140'   | 160'   | 180'   | 200'   | 220'   | 260'   | 300'   |
| 5   | 7,490            | 7,410  | 8,430  | 9,120  | 10,320 |        |        |        |        |        |        |        |
| 8   | 7,560            | 7,560  | 8,780  | 9,350  | 11,200 | 12,040 | 13,340 | 14,280 | 15,422 |        |        |        |
| 10  | 7,890            | 8,780  | 9,810  | 10,660 | 11,690 | 12,200 | 13,580 | 14,630 | 15,650 | 16,680 | 18,760 |        |
| 15  | 8,780            | 9,630  | 10,660 | 11,520 | 12,400 | 12,400 | 13,930 | 15,050 | 16,340 | 17,380 | 19,780 | 21,670 |
| 20  | 10,670           | 11,350 | 11,575 | 12,750 | 13,340 | 13,990 | 14,630 | 15,320 | 16,520 | 17,840 | 19,970 | 21,850 |
| 25  | 11,350           | 11,690 | 12,740 | 14,110 | 14,630 | 15,130 | 16,350 | 17,550 | 18,760 | 19,780 | 20,290 | 22,360 |
| 30  | 12,740           | 13,420 | 13,920 | 14,810 | 15,490 | 16,350 | 17,217 | 18,070 | 18,930 | 19,970 | 21,520 | 23,230 |
| 40  | 14,100           | 14,440 | 14,810 | 15,650 | 17,540 | 18,580 | 19,624 | 20,660 | 21,690 | 22,360 | 24,920 | 26,680 |
| 50  | 14,630           | 16,350 | 18,070 | 18,920 | 19,780 | 20,665 | 21,520 | 22,360 | 24,940 | 25,810 | 29,250 | 30,970 |
| 60  |                  | 18,920 | 19,780 | 21,520 | 22,360 | 23,245 | 24,102 | 24,940 | 26,670 | 29,250 | 32,700 | 34,420 |
| 75  |                  | 21,530 | 22,360 | 24,940 | 25,930 | 26,690 | 27,540 | 29,250 | 30,970 | 32,700 | 37,880 | 39,580 |
| 100 |                  | 22,370 | 24,940 | 26,690 | 29,250 | 30,980 | 32,710 | 34,410 | 35,280 | 37,000 | 39,570 | 41,310 |
| 125 |                  | 26,690 | 29,250 | 30,970 | 32,700 | 34,420 | 37,000 | 38,720 | 41,570 | 44,740 | 48,650 | 49,850 |
| 150 |                  |        | 30,970 | 32,340 | 34,430 | 37,000 | 39,580 | 41,300 | 43,030 | 47,320 | 51,640 | 53,340 |
| 200 |                  |        | 32,700 | 33,430 | 37,880 | 43,030 | 44,750 | 48,190 | 49,910 | 53,360 | 58,520 | 60,180 |
| 250 |                  |        |        |        |        | 51,640 | 53,350 | 55,120 | 58,520 | 61,960 | 63,680 | 68,850 |
| 300 |                  |        |        |        |        | 60,250 | 61,970 | 65,430 | 68,850 | 70,570 | 74,020 | 75,730 |
| 350 |                  |        |        |        |        | 72,620 | 73,950 | 75,730 | 79,180 | 80,880 | 82,620 | 85,980 |

Note: The appraiser must know the horsepower and depth of setting in order to estimate the replacement cost new from the chart.

Turbine pumps are more commonly used than submersibles, primarily due to accessibility of the pump for maintenance purposes. Submersibles tend to exceed the cost of turbines at high settings and tend to be less costly at lower settings.

Add 10% to the above replacement cost new factors for irrigated sprinkler systems.

*(Photograph shown on AH 534.62, page 10)*

# PUMPS

## DIESEL POWERED DEEP WELL IRRIGATION PUMPS

The complete costs installed are divided into three parts: engines, gear heads, and below ground assembly. Costs are based on data from Fresno to the Southern San Joaquin Valley.

### DIESEL ENGINES NEW (Includes Tax and Delivery)

| HP        | Cost                |
|-----------|---------------------|
| 75 – 100  | \$ 9,000 - \$12,000 |
| 100 – 150 | \$11,500 - \$16,000 |
| 150 – 200 | \$14,500 - \$19,000 |
| 200 – 250 | \$19,000 - \$23,000 |
| 250 – 300 | \$23,000 - \$27,000 |
| 300 – 400 | \$27,000 - \$35,000 |

Reconditioned engines, deduct 20 to 30%  
*(Photograph shown on AH 534.62, page 10)*

### GEAR HEADS

| HP  | DRIVE   | SHAFT   | FLANGES<br>(2) | GUARD | LABOR   | TOTAL    |
|-----|---------|---------|----------------|-------|---------|----------|
| 100 | \$2,180 | \$570   | \$315          | \$160 | \$1,560 | \$4,780  |
| 125 | \$2,360 | \$675   | \$420          | \$160 | \$1,560 | \$5,180  |
| 150 | \$2,900 | \$675   | \$420          | \$160 | \$1,560 | \$5,705  |
| 200 | \$3,540 | \$675   | \$420          | \$160 | \$1,560 | \$6,345  |
| 250 | \$5,880 | \$1,040 | \$520          | \$160 | \$1,560 | \$9,005  |
| 300 | \$6,490 | \$1,040 | \$520          | \$160 | \$1,560 | \$9,760  |
| 350 | \$7,600 | \$1,040 | \$520          | \$160 | \$1,560 | \$10,875 |
| 400 | \$9,400 | \$1,150 | \$520          | \$160 | \$1,560 | \$12,775 |

### BELOW GROUND ASSEMBLY (Includes Column—Tube and Shaft and Bowls)

| Gear Head<br>HP | 200' Lift | 300' Lift | 400' Lift | 500' Lift | 600' Lift | 700' Lift |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 100             | \$18,080  | \$21,900  |           |           |           |           |
| 125             | \$23,400  | \$27,380  | \$30,400  |           |           |           |
| 150             | \$25,800  | \$30,400  | \$31,900  |           |           |           |
| 200             |           | \$32,800  | \$34,680  | \$37,100  |           |           |
| 250             |           |           |           | \$39,400  | \$41,850  |           |
| 300             |           |           |           | \$41,000  | \$43,450  | \$45,900  |
| 400             |           |           |           |           |           | \$48,900  |

Add to engine and gear head figures.

**RULE OF THUMB:** The horsepower of the gear head will require an engine with bulk or gross horsepower of about 1-1/2 times the size of the gear head, i.e., 200 HP gear head x 1.5 = 300 HP engine. 300 bulk HP engine x 80 percent = continuous HP x 80 percent = 192 HP to gear head.  
**NOTE:** Costs do not include fuel tanks or fuel tank saddles.

# PUMPS

## DISCHARGE HEADS

| <u>Discharge Size</u> | <u>Price Includes Head, Solenoid, Oiler,<br/>Column, Nipple, and Flange</u> |
|-----------------------|---|
| 4 x 12                | \$1,350   |
| 6 x 12                | 1,620   |
| 8 x 12                | 1,680   |
| 8 x 16 1/2            | 2,100   |
| 10 x 20               | 2,450   |

## COLUMN ASSEMBLY (In 20' lengths)

| Column | Tube   | Shaft    | Price Per Foot |
|--------|--------|----------|----------------|
| 4"     | 1 1/2" | 1"       | \$33           |
| 6"     | 2"     | 1 1/4"   | 46             |
| 8"     | 2 1/2" | 1 1/2"   | 55             |
| 10"    | 2 1/2" | 1 11/16" | 67             |
| 10"    | 3"     | 1 15/16" | 73             |
| 12"    | 3"     | 1 15/16" | 81             |
| 12"    | 3 1/2" | 2 1/4"   | 90             |

Column assembly in 10' lengths—add 10%

Reduce the above costs 10% for the San Joaquin Valley.

# PUMPS

## BOWLS

| Stages | 8"      | 10"     | 12"     | 14"     | 16"     |
|--------|---------|---------|---------|---------|---------|
| 1      | \$1,400 | \$1,700 | \$2,230 | \$3,280 | \$4,650 |
| 2      | 1,510   | 2,100   | 2,750   | 4,000   | 5,250   |
| 3      | 1,840   | 2,490   | 3,540   | 4,850   | 8,130   |
| 4      | 2,230   | 3,000   | 4,100   | 5,640   | 8,260   |
| 5      | 2,760   | 3,410   | 5,000   | 6,890   | 10,230  |
| 6      | 2,880   | 4,000   | 5,510   | 8,000   | 11,540  |
| 7      | 3,150   | 4,470   | 6,170   | 9,120   | 13,120  |
| 8      | 3,410   | 4,990   | 6,890   | 10,230  | 14,430  |
| 9      | 3,870   | 5,550   | 7,740   | 11,020  | 16,130  |
| 10     | 4,130   | 5,770   | 8,260   | 12,140  | 17,640  |
| 11     | 4,520   | 6,300   | 8,980   |         |         |
| 12     | 4,980   | 6,890   | 9,640   |         |         |
| 13     | 5,240   | 7,400   |         |         |         |
| 14     | 5,510   | 7,870   |         |         |         |
| 15     | 6,040   | 8,260   |         |         |         |

Reduce the above costs 10% for the San Joaquin Valley

|   |                                  |
|---|----------------------------------|
| 5 HP to 7 1/2 HP                          | Use 8" bowls                     |
| 10 HP to 20 HP                            | Use 10" bowls                    |
| 25 HP to 60 HP                            | Use 12" bowls                    |
| 75 HP to 350 HP                           | Use 14" bowls up to 150' setting |
| 8" bowls—25' per stage (100' = 4 stages)  |                                  |
| 10" bowls—35' per stage (100' = 3 stages) |                                  |
| 12" bowls—50' per stage (100' = 2 stages) |                                  |
| 14" bowls—60' per stage (100' = 2 stages) |                                  |

## CENTRIFUGAL BOOSTER PUMPS

| Size   | Cost              |
|--------|-------------------|
| 10 HP  | \$3,050 - \$3,480 |
| 20 HP  | \$3,800 - \$4,400 |
| 30 HP  | \$4,600 - \$4,900 |
| 40 HP  | \$5,200 - \$5,650 |
| 50 HP  | \$6,250 - \$6,750 |
| 60 HP  | \$7,400 - \$7,900 |
| 80 HP  | \$8,300 - \$8,750 |
| 100 HP | \$8,950 - \$9,350 |

# PUMPS

## TURBINE BOOSTER PUMPS

| Size   | Cost     |
|--------|----------|
| 40 HP  | \$7,400  |
| 50 HP  | \$8,150  |
| 60 HP  | \$9,500  |
| 75 HP  | \$10,500 |
| 100 HP | \$11,300 |
| 125 HP | \$14,400 |
| 150 HP | \$16,000 |

## SUBMERSIBLE PUMPS

Costs are based on 3-phase, 3,600 RPM pump in a 6" to 18" well. They include normal stages, check valve, power pole, control panel, and installation labor at 0' setting. Costs are relative to settings—low for shallow, high for deep—for installations typical to the horsepower. Add riser pipe and wire costs per linear foot to setting depth. Add well and casing.

| HP  | Motor, Pump, and Stages | Column Assembly    | Recommended Well Size |
|-----|-------------------------|--------------------|-----------------------|
| 5   | 3,000 to 3,600          | \$10.00 to \$14.00 | 8"                    |
| 7 ½ | 3,600 to 4,200          | \$10.00 to \$14.00 | 8"                    |
| 10  | 4,000 to 4,500          | \$10.00 to \$14.00 | 8" to 10"             |
| 15  | 4,600 to 5,400          | \$12.00 to \$16.00 | 10" to 12"            |
| 20  | 5,600 to 6,300          | \$12.00 to \$18.00 | 12"                   |
| 25  | 5,900 to 6,700          | \$15.00 to \$20.00 | 12"                   |
| 30  | 8,000 to 8,800          | \$15.00 to \$20.00 | 12"                   |

High capacity—1,760 RPM (little used) for deep wells. Cost includes pump end and one stage, control panel, power pole, tax, and installation labor.

| HP  | Motor and Pump | Stages          | Riser Pipe and Wire Per Foot | Recommended Well Size |
|-----|----------------|-----------------|------------------------------|-----------------------|
| 40  | \$10,500 +     | \$340 per stage | \$18.55                      | 12"                   |
| 50  | 11,500 +       | 410 per stage   | 23.20                        | 14"                   |
| 60  | 12,400 +       | 450 per stage   | 23.20                        | 14"                   |
| 75  | 13,200 +       | 460 per stage   | 23.20                        | 14"                   |
| 100 | 14,200 +       | 480 per stage   | 23.20                        | 14"                   |



# PUMPS

## SUBMERSIBLE PUMPS

### TAIL WATER PUMPS

| HP  | Cost    | HP | Cost    |
|-----|---------|----|---------|
| 2   | \$3,400 | 20 | \$6,600 |
| 3   | 3,600   | 25 | 7,100   |
| 5   | 3,900   | 30 | 7,400   |
| 7 ½ | 4,300   | 40 | 8,200   |
| 10  | 4,600   | 50 | 9,000   |
| 15  | 5,900   |    |         |

## WELLS

### REVERSE ROTARY DRILLING

(Includes Casing, Gravel Pack, Cement Seal, Development of Well) Cost per foot of depth.

| Size         | To 700' | Over 700' | Over 1,000' |
|--------------|---------|-----------|-------------|
| 6" 12 ga.    | \$32    | \$43      |             |
| 6" 10 ga.    | 37      |           |             |
| 8" 12 ga.    | 43      |           |             |
| 8" 10 ga.    | 47      |           |             |
| 8" 3/16 in.  | 52      | 50        |             |
| 10" 10 ga.   | 55      |           |             |
| 10" 3/16 in. | 59      |           |             |
| 10" 1/4 in.  | 67      | 74        |             |
| 12" 10 ga.   | 68      |           |             |
| 12" 3/16 in. | 73      |           |             |
| 12" 1/4 in.  | 81      | 89        | \$88        |
| 14" 3/16 in. | 84      |           |             |
| 14" 1/4 in.  | 92      | 120       | 122         |
| 14" 5/16 in. | 99      | 132       | 132         |
| 16" 3/16 in. | 91      |           |             |
| 16" 1/4 in.  | 104     |           |             |
| 16" 5/16 in. | 113     | 154       | 154         |
| 18" 3/16 in. | 107     |           |             |
| 18" 1/4 in.  | 127     |           |             |
| 18" 5/16 in. | 148     | 176       | 176         |
| 20" 3/16 in. | 120     |           |             |
| 20" 1/4 in.  | 145     |           |             |
| 20" 5/16 in. | 170     | 200       | 200         |

# PUMPS

## WELLS

| Cable Tool Drilling | Cost Per Foot of Depth |
|---------------------|------------------------|
| 6"                  | \$23 - \$28            |
| 8"                  | \$27 - \$28            |
| 10"                 | \$31 - \$36            |
| 12"                 | \$46 - \$60            |
| 14"                 | \$51 - \$65            |
| 16"                 | \$61 - \$73            |
| 18"                 | \$71 - \$93            |

State law requires 20' seal in all well shafts.

|     |        |
|-----|--------|
| 6"  | \$ 500 |
| 8"  | 800    |
| 10" | 1,000  |
| 12" | 1,000  |
| 14" | 1,250  |
| 16" | 1,250  |
| 18" | 1,250  |

## WINDMILLS

### COST INSTALLED

| Wheel or Fan Diameter | Weight (Pounds) | Cost     | Installation | Total    |
|-----------------------|-----------------|----------|--------------|----------|
| 6'                    | 200             | \$ 2,500 | \$1,250      | \$ 3,800 |
| 8'                    | 370             | 2,850    | 1,265        | 4,100    |
| 10'                   | 660             | 4,000    | 1,450        | 5,500    |
| 12'                   | 1,100           | 5,700    | 1,750        | 7,100    |
| 14'                   | 1,700           | 8,250    | 2,000        | 10,200   |
| 16'                   | 2,500           | 10,900   | 2,400        | 13,300   |

### TOWER REQUIREMENTS FOR FAN SIZE IN DIAMETER

| Tower Height | Windmill Size |         |         |         |         |
|--------------|---------------|---------|---------|---------|---------|
|              | 6' - 8' Fan   | 10' Fan | 12' Fan | 14' Fan | 16' Fan |
| 21'          | \$1,600       | \$1,700 |         |         |         |
| 27'          | 1,850         | 2,300   | \$2,650 | \$2,900 |         |
| 33'          | 2,150         | 2,450   | 2,900   | 3,350   | \$4,500 |
| 40'          | 2,650         | 2,900   | 3,400   | 3,700   | 5,200   |
| 47'          | 4,050         | 3,450   | 4,000   | 5,200   | 6,200   |

# PUMPS

## WINDMILLS

Windmill installation costs are estimated by considering the following:

- Tower height
- Fan diameter
- Force pump: size and diameter
- Cylinder: size and type
- Pipe: size and length
- Rod: material, size and length.

Force pump, cylinder pipe, rod, and miscellaneous costs range from **\$800 to \$2,300**.

### Example

|   |              |
|---|--------------|
| 10' Fan   | \$5,450      |
| 33' Tower   | 2,450        |
| Force Pump, Cylinder Pipe, Rod<br>and Miscellaneous Costs | <u>1,400</u> |
|   | \$9,300      |

Refurbished windmill: deduct 35 to 40% from above prices.

# PUMPS

## WINDMILLS

## WATER STORAGE TANKS

### GALVANIZED COVERED STORAGE TANKS

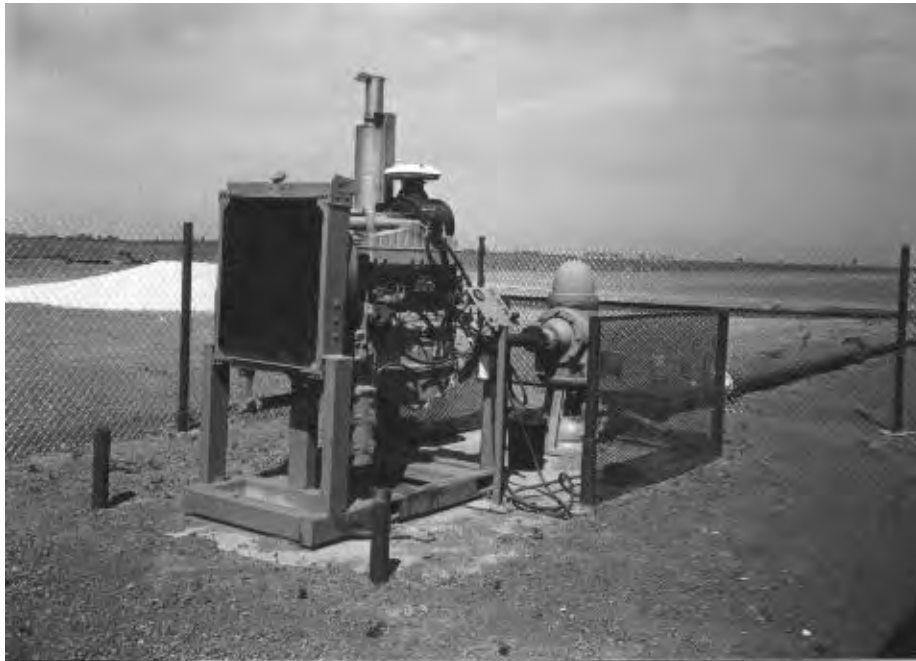
| Gallons | Diameter  | Height | Gauge | Weight (Pounds) | Price    |
|---------|-----------|--------|-------|-----------------|----------|
| 1,044   | 6' 8"     | 48"    | 12    | 670             | \$ 1,300 |
| 1,504   | 8' 10"    | 48"    | 12    | 912             | 1,612    |
| 1,900   | 6' 4"     | 96"    | 12    | 1,014           | 1,664    |
| 2,500   | 7' 4"     | 96"    | 12    | 1,321           | 2,080    |
| 2,880   | 7' 10"    | 96"    | 12    | 1,329           | 2,236    |
| 3,200   | 8' 3"     | 96"    | 12    | 1,423           | 2,392    |
| 3,500   | 8' 8"     | 96"    | 12    | 1,520           | 2,568    |
| 4,200   | 9' 5 1/2" | 96"    | 12    | 1,724           | 3,172    |
| 5,000   | 10' 4"    | 96"    | 12    | 1,924           | 3,380    |
| 5,500   | 10' 10"   | 96"    | 12    | 2,080           | 3,744    |
| 6,000   | 11' 4"    | 96"    | 12    | 2,163           | 3,900    |
| 6,500   | 11' 10"   | 96"    | 12    | 2,210           | 4,160    |
| 7,500   | 10' 4"    | 12'    | 12    | 2,553           | 4,524    |
| 8,600   | 9' 7"     | 16'    | 12    | 2,856           | 4,992    |
| 10,000  | 9' 9"     | 18'    | 12    | 3,169           | 5,782    |
| 12,000  | 10' 2"    | 20'    | 12    | 3,667           | 6,552    |
| 15,000  | 11' 11"   | 18'    | 10    | 5,376           | 8,632    |
| 17,500  | 11' 2"    | 24'    | 10    | 5,995           | 9,620    |
| 20,000  | 11' 11"   | 24'    | 10    | 6,480           | 11,180   |
| 25,000  | 18' 10"   | 12'    | 10    | 7,320           | 13,520   |
| 30,000  | 20' 9"    | 12'    | 10    | 8,500           | 15,340   |

Tanks should be set on a level foundation of ¾" crushed rock that is 4" to 6" deep

# PUMPS



TURBINE PUMP



DIESEL ENGINE  
WITH GEAR HEAD DRIVE

## AH 534.71: CORRALS AND FENCES

This chapter contains various costs associated with corrals and fences. Specifications and costs are included for:

- Steel fencing
- Barbed wire fencing
- Wood fencing
- Wood gates
- Metal gates
- Metal panels
- Vinyl/PVC fencing
- Cattle squeeze

Photographs showing examples of equipment discussed are located at the end of the chapter.

### STEEL FENCING

| Height and Type | Fence Cost Per Linear Foot | Additions   |
|-----------------|----------------------------|---|
| <u>11 Gauge</u> |                            |   |
| 3' chain link   | \$7.30                     | Top Rail: \$1.50 per linear foot                  |
| 4' chain link   | 8.15                       |   |
| 5' chain link   | 10.60                      |   |
| 6' chain link   | 11.85                      | Barbed wire, 3 strands:<br>\$2.25 per linear foot |
| 8' chain link   | 15.00                      |   |
| 10' chain link  | 18.40                      | Barbed coils: \$8.00 per<br>linear foot           |
| 12' chain link  | 29.90                      |   |
| <u>9 Gauge</u>  |                            |   |
| 3' chain link   | \$8.25                     | Barbed wire, 3 strands:                           |
| 4' chain link   | 8.85                       | \$2.40 per linear foot on                         |
| 5' chain link   | 10.60                      | 10' and 12' fence                                 |
| 6' chain link   | 12.95                      |   |
| 8' chain link   | 16.55                      |   |
| 10' chain link  | 21.10                      |   |
| 12' chain link  | 24.70                      |   |

Fences over 1,000 feet, deduct 10%.

# CORRALS AND FENCES

## BARBED WIRE FENCING

| Size and Type                                 | Per Linear Foot/1 Mile or More |
|---|--------------------------------|
| Barbed wire, 3 strand                         | \$2.10 to \$2.55               |
| Barbed wire, 4 strand                         | \$2.30 to \$2.75               |
| Barbed wire, 5 strand                         | \$2.50 to \$3.00               |
| 2 strands barbed, 32" woven wire, steel posts | \$3.65 to \$4.00               |

Fence costs are complete—fencing and posts. Gates are to be added. When gates are added, continue using the total linear distance of the fence for costing and do not deduct for the linear distance of the fence replaced by the gate. Posts are set in concrete on 10' centers.

## WOOD FENCING

### COST PER LINEAR FOOT

| Rail Size | Post Size | Number of Rails |        |        |         |
|-----------|-----------|-----------------|--------|--------|---------|
|           |           | 1               | 2      | 3      | 6       |
| 2" x 8"   | 6" x 6"   | \$6.40          | \$7.40 | \$9.50 | \$12.00 |
| 2" x 6"   | 6" x 4"   | 4.93            | 5.37   | 5.81   | 7.12    |
| 2" x 4"   | 6" x 4"   | 4.78            | 5.06   | 5.34   | 6.40    |
| 1" x 8"   | 6" x 4"   | 4.60            | 5.20   | 5.50   | 6.40    |
| 1" x 6"   | 6" x 4"   | 4.30            | 4.70   | 5.30   | 6.10    |
| 1 ¼" x 6" | 6" x 4"   | 4.43            | 4.50   | 5.55   | 6.60    |
| 2" x 6"   | 4" x 4"   | 4.50            | 4.87   | 5.30   | 6.40    |

All posts figured at 8' on center.

## WOOD GATES

### COST PER GATE

| Height/<br>Description | Width |      |      |       |       |       |       |
|------------------------|-------|------|------|-------|-------|-------|-------|
|                        | 4'    | 6'   | 8'   | 10'   | 12'   | 16'   | 20'   |
| 4' 5 Rails             | \$50  | \$64 | \$81 | \$156 | \$162 | \$178 | \$190 |
| 5' 6 Rails             | 63    | 75   | 121  | 169   | 182   | 196   | 209   |
| 6' 7 Rails             | 75    | 87   | 174  | 185   | 202   | 213   | 230   |

# CORRALS AND FENCES

## METAL GATES

### (INCLUDING POSTS)—COST PER GATE

| Height/<br>Description   | Width |      |       |       |       |       |
|--|-------|------|-------|-------|-------|-------|
|  | 3'    | 4'   | 10'   | 12'   | 14'   | 16'   |
| 4' 1 3/8" Galvanized<br>Tube Galvanized Fabric<br>Including Hardware | \$73  | \$80 | \$168 | \$181 | \$205 | \$235 |
| 5' 1 5/8" Standard Pipe<br>Fabric Including<br>Hardware              | 129   | 148  | 262   | 302   | 328   | 352   |
| 6' 1 5/8" Standard Pipe<br>Fabric Including<br>Hardware              | 140   | 158  | 285   | 341   | 381   | 420   |

### 5-BAR ADJUSTABLE GATES—5' IN HEIGHT

| Size       | Cost Per Gate |
|------------|---------------|
| 3' to 4'   | \$ 82.00      |
| 4' to 6'   | 92.00         |
| 6' to 8'   | 117.00        |
| 8' to 10'  | 132.00        |
| 10' to 12' | 143.00        |
| 12' to 14' | 171.00        |
| 14' to 16' | 203.00        |
| 16' to 20' | 257.00        |

### 6-BAR ADJUSTABLE GATES—5' IN HEIGHT

| Size       | Cost Per Gate |
|------------|---------------|
| 3' to 4'   | \$ 90.00      |
| 4' to 6'   | 105.00        |
| 6' to 8'   | 133.00        |
| 8' to 10'  | 150.00        |
| 10' to 12' | 161.00        |
| 12' to 14' | 193.00        |
| 14' to 16' | 204.00        |
| 16' to 20' | 252.00        |



# CORRALS AND FENCES

## METAL PANELS

### 5-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

| Size       | Cost Per Gate |
|------------|---------------|
| 8' to 10'  | \$111.00      |
| 10' to 12' | 129.00        |
| 12' to 14' | 138.00        |
| 14' to 16' | 161.00        |
| 16' to 18' | 180.00        |
| 18' to 20' | 194.00        |
| 20' to 22' | 208.00        |
| 22' to 24' | 213.00        |
| 24' to 26' | 228.00        |

Add for the hinge and latch posts - **\$35 to \$40**

### 6-BAR ADJUSTABLE PANEL USED FOR STALLS OR PENS

| Size       | Cost Per Gate |
|------------|---------------|
| 8' to 10'  | \$133.00      |
| 10' to 12' | 148.00        |
| 12' to 14' | 163.00        |
| 14' to 16' | 188.00        |
| 16' to 18' | 203.00        |
| 18' to 20' | 231.00        |
| 20' to 22' | 242.00        |
| 22' to 24' | 260.00        |
| 24' to 26' | 270.00        |

### 3-BAR FENCE PANEL

| Size | Cost Per Gate |
|------|---------------|
| 10'  | \$ 72.00      |
| 12'  | 85.00         |
| 16'  | 98.00         |
| 18'  | 105.00        |
| 20'  | 117.00        |
| 24'  | 131.00        |

### PORTABLE LOADING CHUTE

| Size          | Cost Per Gate |
|---------------|---------------|
| 30" x 5' High | \$1,575       |

# CORRALS AND FENCES

## METAL PANELS

### 5-BAR SOLID PANEL

| Size | Cost Per Gate |
|------|---------------|
| 10'  | \$106.00      |
| 12'  | 117.00        |
| 16'  | 155.00        |
| 18'  | 166.00        |
| 20'  | 180.00        |
| 24'  | 202.00        |

### 6-BAR SOLID PANEL

| Size | Cost Per Gate |
|------|---------------|
| 10'  | \$ 116.00     |
| 12'  | 131.00        |
| 16'  | 173.00        |
| 18'  | 180.00        |
| 20'  | 200.00        |
| 24'  | 229.00        |

## VINYL/PVC FENCING

### White

| Post Size | Rail Size             | Number of Rails | Cost Per Linear Foot Installed |
|-----------|-----------------------|-----------------|--------------------------------|
| 5" x 5"   | 1-1/2" x 5-1/2" x 16' | 3               | \$13.72                        |
| 5" x 5"   | 1-1/2" x 5-1/2" x 16' | 4               | \$14.43                        |

Prices based on 1,000' +

**Height:** 60 inches

**Posts:** Set in concrete—10" diameter, 30" deep, 8' on center

**Gates:** 12' Metal gates (preferred)—\$**650** installed, plus paint

12' PVC gates (have tendency to sag)—\$**1,000** installed

**Color:** Add 10%

*(Photograph shown on AH 534.71, page 7)*

# CORRALS AND FENCES

## CATTLE SQUEEZE

|                        |                    |
|------------------------|--------------------|
| Hydraulic Metal        | \$5,700 to \$6,760 |
| Upright Metal          | \$1,870 to \$2,080 |
| Upright Metal Extended | \$2,080 to \$2,600 |
| Calf Chute or Table    | \$930 to \$1,040   |

*(Photograph shown on AH 534.71, page 8)*

## CORRALS AND FENCES



VINYL FENCING

## CORRALS AND FENCES



CATTLE SQUEEZE

## AH 534.75: GREENHOUSES

This chapter contains specifications and costs for greenhouses. Photographs showing examples of buildings discussed are located at the end of the chapter.

Commercial greenhouses are constructed with steel or wood posts and trusses on 10' ± centers. Some of the greenhouses have a polycarbonate, fiberglass cover, glass cover, or a polyethylene plastic cover. The span of the truss is generally 20 to 40 feet.

- Some greenhouses are constructed as a Quonset design with metal ribs and fiberglass cover.
- Wall heights vary from 7 feet to 10 feet on the straight wall construction.

### BUILDING SPECIFICATIONS

| Components    | Low Quality   | Average Quality   | High Quality  |
|---------------|---|---|---|
| Wall and Roof | Light pipe, 4' wall, single light polyethylene cover, fiberglass ends | Galvanized steel frame, 8' wall, double polycarbonate or fiberglass cover | Heavy steel frame, 8' wall, glass or multi-wall polycarbonate cover |
| Floor         | Dirt—some gravel  | Gravel—some concrete walks  | Adequate concrete walks, concrete foundation                        |
| Interior      | No lighting, minimum water  | Average lighting, water, and roof vents                                   | Ample lighting, water, roof vents, and exhaust fans                 |

*(Photographs shown on AH 534.75, page 3)*

### SQUARE-FOOT COSTS

|         | Square-Foot Area |        |        |        |        |        |
|---------|------------------|--------|--------|--------|--------|--------|
| Quality | 3,000-5,000      | 10,000 | 20,000 | 30,000 | 40,000 | 50,000 |
| Low     | 3.65             | 3.25   | 3.15   | 3.00   | 2.65   | 2.45   |
| Average | 15.25            | 14.25  | 12.00  | 11.50  | 11.00  | 10.50  |
| High    | 20.30            | 18.90  | 16.50  | 15.50  | 14.50  | 14.25  |

### ADDITIVES

|                          |  |
|--------------------------|--|
| Additional concrete walk | \$3.00 to \$3.40 per square foot                 |
| Benching                 | \$2.70 to \$3.25 per square foot—average quality |
| Gravel floor             | \$.30 - \$.35 per square foot                    |

# GREENHOUSES

## SHADE CLOTH HOUSES

### FAIR TO LOW COST

Wood or steel post construction, no walls. Overhead cable support with wire, covered by a flat shade fabric normally 7' to 9' high. The following costs are with a dirt floor.

| Square-Foot Area | Cost Per Square Foot |
|------------------|----------------------|
| Under 10,000     | \$1.40 to \$1.50     |
| 10,000 – 20,000  | \$1.10 to \$1.25     |
| 20,000 – 40,000  | \$1.00 to \$1.10     |
| 40,000 Up        | \$0.95 to \$1.05     |

*(Photographs shown on AH 534.75, page 4)*

### ADDITIVE

Gravel Floor                      **\$.30 to \$.45** per square foot

# GREENHOUSES

## CLIMATE CONTROL





# GREENHOUSES

## SHADE CLOTH HOUSES



## **AH 534.76: LAND DEVELOPMENT AND DRAINAGE TILE**

This chapter presents some of the costs incurred in the process of converting raw land to that which is suitable for its intended agricultural purpose. The land development portion provides costs for leveling of land, moving soil, and ripping of the land. The drainage portion provides drainage pipe costs to allow control of water on the land.

### **LAND DEVELOPMENT**

#### **LEVELING COST**

| <b>Item</b>             | <b>Per Acre</b>      |
|-------------------------|----------------------|
| Native Land             | \$367.50 to \$735.00 |
| Ripping and Relieving   | \$420.00 to \$682.50 |
| Touch-Up Leveling—Laser | \$115.50 to \$147.00 |
| Rescaping               | \$73.50 to \$94.50   |

#### **EARTH MOVING**

| <b>Size</b>    | <b>Cost</b>    |
|----------------|----------------|
| Per cubic yard | \$.74 to \$.95 |

#### **RIPPING**

| <b>Item</b>           | <b>Cost</b>    |
|-----------------------|----------------|
| Clay 5' deep          | \$420 to \$498 |
| Clay 6' deep          | \$420 to \$630 |
| Loamy or sandy soil   | \$262 to \$420 |
| Hard pan 4' - 6' deep | \$420 to \$682 |

#### **NOTE:**

1. Ripping costs are based on four-foot centers.
2. Ripping cost with a slip plow attached to shank (superior mixing and breaking of soils) is typically done on six-foot centers, and the cost is equal to standard ripping on four-foot centers.
3. Typically takes ten hours to rip seven acres on four-foot centers.

# LAND DEVELOPMENT AND DRAINAGE TILE

## DRAINAGE

Modern drainage tile installations use corrugated plastic tubing. The spacing varies from 100 feet to 400 feet on centers. The older type installation includes perforated tile with wide trenches. A 5-inch corrugated plastic drain tubing is installed in a 12-inch trench versus a 24-inch to 27-inch trench for the older type installation. The cost for gravel fill is much less because of the narrower trench.

The installed cost of 5-inch corrugated plastic tubing on 400-foot centers, 7 1/2-feet deep including sump and pump, and trench width of 12 inches with gravel fill over the pipe is as follows.

### DRAINAGE PIPE

|             |                           |
|-------------|---------------------------|
| Loamy soils | \$473 to \$682 per acre   |
| Rocky soils | \$682 to \$1,050 per acre |

Reduce the above cost 25% if system lacks a pump or sump.

Increase the above cost 25% if the system has 100-foot centers, with 4-inch lines

## AH 534.77: VINEYARD STAKES AND TRELLIS SYSTEMS

This chapter contains costs for various stake and trellis systems used in the production of grapes for table, raisin, and wine grapes. Miscellaneous vineyard component costs are also provided for the following:

- Wire price per acre
- Metal stakes and cross-arms
- Wood stakes and cross-arms
- Deer fence

The Useful Information page at the end of the chapter contains a conversion chart for wire sizes, along with a chart for the spacing of plants and an estimate of the amount of wire required.

Vineyard stakes and trellis costs can vary significantly due to differences in the following:

- Nature and quality of material
- Spacing between the rows of vines
- Type of vineyard
- Cost of labor (farm labor or commercial contractor)

Photographs showing examples of the improvements discussed are located at the end of this chapter.

*(Photograph shown on AH 534.77, page 17)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## TABLE GRAPES

### SINGLE CROSS-ARM

#### 10 FOOT ROWS

|                                     | Spacing—6' x 10' or 7' x 10' or 8' x 10' |                |               |
|-------------------------------------|--|----------------|---------------|
|                                     | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly         | \$5.85                                   |                |               |
| Every 15 feet                       | \$5.85                                   | 290            | \$1,697       |
| Every 18 feet                       | \$5.85                                   | 242            | \$1,416       |
| Every 21 feet                       | \$5.85                                   | 207            | \$1,211       |
| Every 24 feet                       | \$5.85                                   | 182            | \$1,065       |
| Four wires                          |  |                | \$427         |
| End post with anchor (installed)    | \$37.00                                  | 14             | \$518         |
| End post without anchor (installed) | \$29.00                                  | 14             | \$406         |

#### 11 FOOT ROWS

|                                     | Spacing—6' x 11' or 7' x 11' or 8' x 11' |                |               |
|-------------------------------------|--|----------------|---------------|
|                                     | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly         | \$5.85                                   |                |               |
| Every 15 feet                       | \$5.85                                   | 264            | \$1,544       |
| Every 18 feet                       | \$5.85                                   | 220            | \$1,287       |
| Every 21 feet                       | \$5.85                                   | 188            | \$1,100       |
| Every 24 feet                       | \$5.85                                   | 165            | \$965         |
| Four wires                          |  |                | \$395         |
| End post with anchor (installed)    | \$37.00                                  | 13             | \$481         |
| End post without anchor (installed) | \$29.00                                  | 13             | \$377         |

#### 12 FOOT ROWS

|                                     | Spacing—6' x 12' or 7' x 12' or 8' x 12' |                |               |
|-------------------------------------|--|----------------|---------------|
|                                     | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly         | \$5.85                                   |                |               |
| Every 15 feet                       | \$5.85                                   | 242            | \$1,416       |
| Every 18 feet                       | \$5.85                                   | 201            | \$1,176       |
| Every 21 feet                       | \$5.85                                   | 172            | \$1,006       |
| Every 24 feet                       | \$5.85                                   | 151            | \$883         |
| Four wires                          |  |                | \$348         |
| End post with anchor (installed)    | \$37.00                                  | 12             | \$444         |
| End post without anchor (installed) | \$29.00                                  | 12             | \$348         |

Based on 600 foot rows

*(Photographs shown on AH 534.77, page 18)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## TABLE GRAPES

### DOUBLE CROSS-ARM

#### 10 FOOT ROWS

|                                     | Spacing—6' x 10' or 7' x 10' or 8' x 10' |                |               |
|-------------------------------------|--|----------------|---------------|
|                                     | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly         | \$6.60                                   |                |               |
| Every 15 feet                       | \$6.60                                   | 290            | \$1,914       |
| Every 18 feet                       | \$6.60                                   | 242            | \$1,597       |
| Every 21 feet                       | \$6.60                                   | 207            | \$1,366       |
| Every 24 feet                       | \$6.60                                   | 182            | \$1,201       |
| Six wires                           |  |                | \$640         |
| End post with anchor (installed)    | \$37.00                                  | 14             | \$518         |
| End post without anchor (installed) | \$29.00                                  | 14             | \$406         |

#### 11 FOOT ROWS

|                                     | Spacing—6' x 11' or 7' x 11' or 8' x 11' |                |               |
|-------------------------------------|--|----------------|---------------|
|                                     | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly         | \$6.60                                   |                |               |
| Every 15 feet                       | \$6.60                                   | 264            | \$1,742       |
| Every 18 feet                       | \$6.60                                   | 220            | \$1,452       |
| Every 21 feet                       | \$6.60                                   | 188            | \$1,241       |
| Every 24 feet                       | \$6.60                                   | 165            | \$1,089       |
| Six wires                           |  |                | \$580         |
| End post with anchor (installed)    | \$37.00                                  | 13             | \$481         |
| End post without anchor (installed) | \$29.00                                  | 13             | \$377         |

#### 12 FOOT ROWS

|                                     | Spacing—6' x 12' or 7' x 12' or 8' x 12' |                |               |
|-------------------------------------|--|----------------|---------------|
|                                     | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly         | \$6.60                                   |                |               |
| Every 15 feet                       | \$6.60                                   | 242            | \$1,597       |
| Every 18 feet                       | \$6.60                                   | 201            | \$1,327       |
| Every 21 feet                       | \$6.60                                   | 172            | \$1,135       |
| Every 24 feet                       | \$6.60                                   | 151            | \$997         |
| Six wires                           |  |                | \$534         |
| End post with anchor (installed)    | \$37.00                                  | 12             | \$444         |
| End post without anchor (installed) | \$29.00                                  | 12             | \$348         |

Based on 600 foot rows

*(Photographs shown on AH 534.77, page 19)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## TABLE GRAPES/RAISINS

### OPEN GABLE TRELLIS

#### 10 FOOT ROWS

|                                  | Spacing—6' x 10' or 7' x 10' or 8' x 10' |                |               |
|----------------------------------|--|----------------|---------------|
|                                  | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly      | \$14.00                                  |                |               |
| Every 18 feet                    | \$14.00                                  | 242            | \$3,388       |
| Every 21 feet                    | \$14.00                                  | 207            | \$2,898       |
| Every 24 feet                    | \$14.00                                  | 182            | \$2,548       |
| Six wires                        |  |                | \$640         |
| Eight wires                      |  |                | \$853         |
| End post with anchor (installed) | \$37.00                                  | 14             | \$518         |

#### 11 FOOT ROWS

|                                  | Spacing—6' x 11' or 7' x 11' or 8' x 11' |                |               |
|----------------------------------|--|----------------|---------------|
|                                  | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly      | \$14.00                                  |                |               |
| Every 18 feet                    | \$14.00                                  | 220            | \$3,080       |
| Every 21 feet                    | \$14.00                                  | 188            | \$2,632       |
| Every 24 feet                    | \$14.00                                  | 165            | \$2,310       |
| Six wires                        |  |                | \$582         |
| Eight wires                      |  |                | \$774         |
| End post with anchor (installed) | \$37.00                                  | 13             | \$481         |

#### 12 FOOT ROWS

|                                  | Spacing—6' x 12' or 7' x 12' or 8' x 12' |                |               |
|----------------------------------|--|----------------|---------------|
|                                  | Cost Per Unit                            | Posts Per Acre | Cost Per Acre |
| Post and cross-arm assembly      | \$14.00                                  |                |               |
| Every 18 feet                    | \$14.00                                  | 201            | \$2,814       |
| Every 21 feet                    | \$14.00                                  | 172            | \$2,408       |
| Every 24 feet                    | \$14.00                                  | 151            | \$2,114       |
| Six wires                        |  |                | \$534         |
| Eight wires                      |  |                | \$711         |
| End post with anchor (installed) | \$37.00                                  | 12             | \$444         |

Based on 600 foot rows

*(Photographs shown on AH 534.77, page 20)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## RAISIN GRAPES

### TRELLIS

#### 10 FOOT ROWS

|                                  | Cost Per Unit | Posts Per Acre | Cost Per Acre |          |          |
|----------------------------------|---------------|----------------|---------------|----------|----------|
|                                  |               |                | 5' x 10'      | 6' x 10' | 7' x 10' |
| Light 7' stake and 24" cross-arm | \$4.98        |                |               |          |          |
| Every 5 feet                     | \$4.98        | 871            | \$4,338       |          |          |
| Every 6 feet                     | \$4.98        | 726            |               | \$3,615  |          |
| Every 7 feet                     | \$4.98        | 622            |               |          | \$3,098  |
| Two wires                        |               |                | \$217         | \$217    | \$217    |
| End post                         | \$29.00       | 14             | \$406         | \$406    | \$406    |
| Light 7' stake with no cross-arm | \$3.75        |                | \$3,092       | \$2,577  | \$2,208  |
| One wire                         |               |                | \$108         | \$108    | \$108    |

#### 11 FOOT ROWS

|                                  | Cost Per Unit | Posts Per Acre | Cost Per Acre |          |          |
|----------------------------------|---------------|----------------|---------------|----------|----------|
|                                  |               |                | 5' x 11'      | 6' x 11' | 7' x 11' |
| Light 7' stake and 24" cross-arm | \$4.98        |                |               |          |          |
| Every 5 feet                     | \$4.98        | 792            | \$3,944       |          |          |
| Every 6 feet                     | \$4.98        | 660            |               | \$3,287  |          |
| Every 7 feet                     | \$4.98        | 566            |               |          | \$2,819  |
| Two wires                        |               |                | \$197         | \$197    | \$197    |
| End post                         | \$29.00       | 13             | \$377         | \$377    | \$377    |
| Light 7' stake with no cross-arm | \$3.75        |                | \$2,970       | \$2,475  | \$2,122  |
| One wire                         |               |                | \$98          | \$98     | \$98     |

#### 12 FOOT ROWS

|                                  | Cost Per Unit | Posts Per Acre | Cost Per Acre |          |          |
|----------------------------------|---------------|----------------|---------------|----------|----------|
|                                  |               |                | 5' x 12'      | 6' x 12' | 7' x 12' |
| Light 7' stake and 24" cross-arm | \$4.98        |                |               |          |          |
| Every 5 feet                     | \$4.98        | 726            | \$3,615       |          |          |
| Every 6 feet                     | \$4.98        | 605            |               | \$3,013  |          |
| Every 7 feet                     | \$4.98        | 518            |               |          | \$2,580  |
| Two wires                        |               |                | \$165         | \$165    | \$165    |
| End post                         | \$29.00       | 12             | \$348         | \$348    | \$348    |
| Light 7' stake with no cross-arm | \$3.75        |                | \$2,504       | \$2,087  | \$1,787  |
| One wire                         |               |                | \$82          | \$82     | \$82     |

*(Drawing and photograph shown on AH 534.77, page 21)*



# VINEYARD STAKES AND TRELLIS SYSTEMS

## RAISIN GRAPES

### OVERHEAD DRY ON VINE TRELLIS

Commonly used in 12' row with 6' between vines; occasionally used on 10' and 11' rows; a few 8' and 9' rows.

**Materials:** Wood post 12' on ends, 9' on sides, 10' wood post every third vine with 36" cross-arm, 8 wires per row, and cable support.

**Trellising Cost Per Acre:**

\$4,700 to \$5,100 on 6' x 12' spacing  
\$5,100 to \$5,600 on 10' and 11' rows  
\$5,600 to \$6,600 on 8' and 9' rows

*(Drawing and photograph shown on AH 534.77, page 22)*

### T-POST DRY ON VINE TRELLIS

**T-Posts:**

V8' T-post every 28' with two 10' cross-arms and 5 wires. In between T-posts are 2 bent 7' to 8' T-posts with 2 wires. Each vine will have a training stake. Each end has a heavy steel post with anchors.

Cost: **\$2,500 to \$3,100** for 7' x 12' spacing.

*(Photographs shown on AH 534.77, page 23)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS

#### 6 FOOT ROWS

|   | Cost Per Unit | Vines Per Acre |          |          |
|---|---------------|----------------|----------|----------|
|   |               | 1,815          | 1,452    | 1,210    |
|   |               | Cost Per Acre  |          |          |
|   |               | 4' x 6'        | 5' x 6'  | 6' x 6'  |
| 22 end posts per acre with anchor                                     | \$37          | \$814          | \$814    | \$814    |
| 22 end posts per acre without anchor                                  | \$29          | \$638          | \$638    | \$638    |
| 7' Light T-post (Add 30% for heavy T-post)                            |               |                |          |          |
| Every vine  | \$3.50        | \$6,353        | \$5,082  | \$4,235  |
| Every other vine  | \$1.75        | \$3,176        | \$2,541  | \$2,118  |
| Every third vine  | \$1.17        | \$2,124        | \$1,699  | \$1,416  |
| Every fourth vine   | \$.88         | \$1,597        | \$1,278  | \$1,065  |
| 8' Vertical line post (13 ga.)  |               |                |          |          |
| Every vine  | \$8.48        | \$15,391       | \$12,313 | \$10,261 |
| Every other vine  | \$4.24        | \$7,696        | \$6,156  | \$5,130  |
| Every third vine  | \$2.83        | \$5,136        | \$4,109  | \$3,424  |
| Every fourth vine   | \$2.12        | \$3,848        | \$3,078  | \$2,565  |
| 4' Rebar or pencil rod at each vine (between T-post or vertical line) | \$.64         |                |          |          |
| One rebar between posts   | \$.32         | \$581          | \$465    | \$387    |
| Two rebars between posts  | \$.42         | \$775          | \$621    | \$517    |
| Three rebars between posts  | \$.48         | \$871          | \$697    | \$581    |
| 24" cross-arm (Add 25% for 30" cross-arm)                             |               |                |          |          |
| Every vine  | \$1.48        | \$2,686        | \$2,149  | \$1,791  |
| Every other vine  | \$.74         | \$1,343        | \$1,074  | \$895    |
| Every third vine  | \$.49         | \$889          | \$711    | \$593    |
| Every fourth vine   | \$.37         | \$672          | \$537    | \$448    |
| Two wires   |               | \$340          | \$340    | \$340    |
| Three wires   |               | \$511          | \$511    | \$511    |
| Four wires  |               | \$680          | \$680    | \$680    |
| Five wires  |               | \$851          | \$851    | \$851    |
| Six wires   |               | \$1,022        | \$1,022  | \$1,022  |
| Seven wires   |               | \$1,192        | \$1,192  | \$1,192  |
| Eight wires   |               | \$1,362        | \$1,362  | \$1,362  |

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS

#### 7 FOOT ROWS

|   | Cost Per Unit | Vines Per Acre |          |         |         |
|---|---------------|----------------|----------|---------|---------|
|   |               | 1,555          | 1,245    | 1,037   | 889     |
|   |               | Cost Per Acre  |          |         |         |
|   |               | 4' x 7'        | 5' x 7'  | 6' x 7' | 7' x 7' |
| 20 end posts per acre with anchor                                     | \$37          | \$740          | \$740    | \$740   | \$740   |
| 20 end posts per acre without anchor                                  | \$29          | \$580          | \$580    | \$580   | \$580   |
| 7' Light T-post (Add 30% for heavy T-post)                            |               |                |          |         |         |
| Every vine  | \$3.50        | \$5,443        | \$4,358  | \$3,630 | \$3,112 |
| Every other vine  | \$1.75        | \$2,721        | \$2,179  | \$1,815 | \$1,556 |
| Every third vine  | \$1.17        | \$1,819        | \$1,457  | \$1,213 | \$1,040 |
| Every fourth vine   | \$.88         | \$1,368        | \$1,096  | \$913   | \$782   |
| 8' Vertical line post (13 ga.)  |               |                |          |         |         |
| Every vine  | \$8.48        | \$13,186       | \$10,558 | \$8,794 | \$7,539 |
| Every other vine  | \$4.24        | \$6,593        | \$5,479  | \$4,397 | \$3,769 |
| Every third vine  | \$2.83        | \$4,401        | \$3,523  | \$2,935 | \$2,516 |
| Every fourth vine   | \$2.12        | \$3,297        | \$2,639  | \$2,198 | \$1,885 |
| 4' Rebar or pencil rod at each vine (between T-post or vertical line) | \$.64         |                |          |         |         |
| One rebar between posts   | \$.32         | \$498          | \$398    | \$332   | \$284   |
| Two rebars between posts  | \$.42         | \$653          | \$523    | \$436   | \$373   |
| Three rebars between posts  | \$.48         | \$746          | \$598    | \$498   | \$427   |
| 24" cross-arm (Add 25% for 30" cross-arm)                             |               |                |          |         |         |
| Every vine  | \$1.48        | \$2,301        | \$1,843  | \$1,535 | \$1,316 |
| Every other vine  | \$.74         | \$1,151        | \$921    | \$767   | \$658   |
| Every third vine  | \$.49         | \$762          | \$610    | \$508   | \$436   |
| Every fourth vine   | \$.37         | \$575          | \$461    | \$384   | \$329   |
| Two wires   |               | \$289          | \$289    | \$289   | \$289   |
| Three wires   |               | \$438          | \$438    | \$438   | \$438   |
| Four wires  |               | \$584          | \$584    | \$584   | \$584   |
| Five wires  |               | \$730          | \$730    | \$730   | \$730   |
| Six wires   |               | \$875          | \$875    | \$875   | \$875   |
| Seven wires   |               | \$1,021        | \$1,021  | \$1,021 | \$1,021 |
| Eight wires   |               | \$1,156        | \$1,156  | \$1,156 | \$1,156 |

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS

#### 8 FOOT ROWS

|   | Cost Per Unit | Vines Per Acre |         |         |         |
|---|---------------|----------------|---------|---------|---------|
|   |               | 1,089          | 907     | 778     | 681     |
|   |               | Cost Per Acre  |         |         |         |
|   |               | 5' x 8'        | 6' x 8' | 7' x 8' | 8' x 8' |
| 18 end posts per acre with anchor                                     | \$37          | \$666          | \$666   | \$666   | \$666   |
| 18 end posts per acre without anchor                                  | \$29          | \$522          | \$522   | \$522   | \$522   |
| 7' Light T-post (Add 30% for heavy T-post)                            |               |                |         |         |         |
| Every vine  | \$3.50        | \$3,812        | \$3,175 | \$2,723 | \$2,384 |
| Every other vine  | \$1.75        | \$1,906        | \$1,587 | \$1,362 | \$1,192 |
| Every third vine  | \$1.17        | \$1,274        | \$1,061 | \$910   | \$797   |
| Every fourth vine   | \$.88         | \$958          | \$798   | \$685   | \$599   |
| 8' Vertical line post (13 ga.)  |               |                |         |         |         |
| Every vine  | \$8.48        | \$9,235        | \$7,691 | \$6,597 | \$5,775 |
| Every other vine  | \$4.24        | \$4,617        | \$3,846 | \$3,299 | \$2,887 |
| Every third vine  | \$2.83        | \$3,082        | \$2,567 | \$2,202 | \$1,927 |
| Every fourth vine   | \$2.12        | \$2,309        | \$1,923 | \$1,649 | \$1,444 |
| 4' Rebar or pencil rod at each vine (between T-post or vertical line) | \$.64         |                |         |         |         |
| One rebar between posts   | \$.32         | \$348          | \$290   | \$249   | \$218   |
| Two rebars between posts  | \$.42         | \$457          | \$381   | \$327   | \$286   |
| Three rebars between posts  | \$.48         | \$523          | \$435   | \$373   | \$327   |
| 24" cross-arm (Add 25% for 30" cross-arm)                             |               |                |         |         |         |
| Every vine  | \$1.48        | \$1,612        | \$1,342 | \$1,151 | \$1,008 |
| Every other vine  | \$.74         | \$806          | \$671   | \$576   | \$504   |
| Every third vine  | \$.49         | \$534          | \$444   | \$381   | \$334   |
| Every fourth vine   | \$.37         | \$403          | \$336   | \$288   | \$252   |
| Two wires   |               | \$257          | \$257   | \$257   | \$257   |
| Three wires   |               | \$385          | \$385   | \$385   | \$385   |
| Four wires  |               | \$511          | \$511   | \$511   | \$511   |
| Five wires  |               | \$639          | \$639   | \$639   | \$639   |
| Six wires   |               | \$769          | \$769   | \$769   | \$769   |
| Seven wires   |               | \$897          | \$897   | \$897   | \$897   |
| Eight wires   |               | \$1,023        | \$1,023 | \$1,023 | \$1,023 |

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS

#### 9 FOOT ROWS

|   | Cost Per Unit | Vines Per Acre |         |         |         |
|---|---------------|----------------|---------|---------|---------|
|   |               | 968            | 807     | 691     | 605     |
|   |               | Cost Per Acre  |         |         |         |
|   |               | 5' x 9'        | 6' x 9' | 7' x 9' | 8' x 9' |
| 16 end posts per acre with anchor                                     | \$37          | \$592          | \$592   | \$592   | \$592   |
| 16 end posts per acre without anchor                                  | \$29          | \$464          | \$464   | \$464   | \$464   |
| 7' Light T-post (Add 30% for heavy T-post)                            |               |                |         |         |         |
| Every vine  | \$3.50        | \$3,388        | \$2,825 | \$2,419 | \$2,118 |
| Every other vine  | \$1.75        | \$1,694        | \$1,412 | \$1,209 | \$1,059 |
| Every third vine  | \$1.17        | \$1,133        | \$944   | \$808   | \$708   |
| Every fourth vine   | \$.88         | \$852          | \$710   | \$608   | \$532   |
| 8' Vertical line post (13 ga.)  |               |                |         |         |         |
| Every vine  | \$8.48        | \$8,209        | \$6,843 | \$5,860 | \$5,130 |
| Every other vine  | \$4.24        | \$4,104        | \$3,422 | \$2,930 | \$2,565 |
| Every third vine  | \$2.83        | \$2,739        | \$2,284 | \$1,956 | \$1,712 |
| Every fourth vine   | \$2.12        | \$2,052        | \$1,711 | \$1,465 | \$1,283 |
| 4' Rebar or pencil rod at each vine (between T-post or vertical line) | \$.64         |                |         |         |         |
| One rebar between posts   | \$.32         | \$310          | \$258   | \$221   | \$194   |
| Two rebars between posts  | \$.42         | \$407          | \$339   | \$290   | \$254   |
| Three rebars between posts  | \$.48         | \$465          | \$387   | \$332   | \$290   |
| 24" cross-arm (Add 25% for 30" cross-arm)                             |               |                |         |         |         |
| Every vine  | \$1.48        | \$1,433        | \$1,194 | \$1,023 | \$895   |
| Every other vine  | \$.74         | \$716          | \$597   | \$511   | \$448   |
| Every third vine  | \$.49         | \$474          | \$395   | \$339   | \$296   |
| Every fourth vine   | \$.37         | \$358          | \$299   | \$256   | \$224   |
| Two wires   |               | \$242          | \$242   | \$242   | \$242   |
| Three wires   |               | \$362          | \$362   | \$362   | \$362   |
| Four wires  |               | \$484          | \$484   | \$484   | \$484   |
| Five wires  |               | \$605          | \$605   | \$605   | \$605   |
| Six wires   |               | \$726          | \$726   | \$726   | \$726   |
| Seven wires   |               | \$848          | \$848   | \$848   | \$848   |
| Eight wires   |               | \$1,032        | \$1,032 | \$1,032 | \$1,032 |

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS

#### 10 FOOT ROWS

|   | Cost Per Unit | Vines Per Acre |          |          |          |
|---|---------------|----------------|----------|----------|----------|
|   |               | 871            | 726      | 622      | 544      |
|   |               | Cost Per Acre  |          |          |          |
|   |               | 5' x 10'       | 6' x 10' | 7' x 10' | 8' x 10' |
| 14 end posts per acre with anchor                                     | \$37          | \$518          | \$518    | \$518    | \$518    |
| 14 end posts per acre without anchor                                  | \$29          | \$406          | \$406    | \$406    | \$406    |
| 7' Light T-post (Add 30% for heavy T-post)                            |               |                |          |          |          |
| Every vine  | \$3.50        | \$3,049        | \$2,541  | \$2,177  | \$1,904  |
| Every other vine  | \$1.75        | \$1,524        | \$1,271  | \$1,089  | \$952    |
| Every third vine  | \$1.17        | \$1,019        | \$849    | \$728    | \$636    |
| Every fourth vine   | \$.88         | \$766          | \$639    | \$547    | \$479    |
| 8' Vertical line post (13 ga.)  |               |                |          |          |          |
| Every vine  | \$8.48        | \$7,386        | \$6,156  | \$5,275  | \$4,613  |
| Every other vine  | \$4.24        | \$3,693        | \$3,078  | \$2,637  | \$2,307  |
| Every third vine  | \$2.83        | \$2,465        | \$2,055  | \$1,760  | \$1,540  |
| Every fourth vine   | \$2.12        | \$1,847        | \$1,539  | \$1,319  | \$1,153  |
| 4' Rebar or pencil rod at each vine (between T-post or vertical line) | \$.64         |                |          |          |          |
| One rebar between posts   | \$.32         | \$279          | \$232    | \$199    | \$174    |
| Two rebars between posts  | \$.42         | \$366          | \$305    | \$261    | \$228    |
| Three rebars between posts  | \$.48         | \$418          | \$348    | \$299    | \$261    |
| 24" cross-arm (Add 25% for 30" cross-arm)                             |               |                |          |          |          |
| Every vine  | \$1.48        | \$1,289        | \$1,074  | \$921    | \$805    |
| Every other vine  | \$.74         | \$645          | \$537    | \$460    | \$403    |
| Every third vine  | \$.49         | \$427          | \$356    | \$305    | \$267    |
| Every fourth vine   | \$.37         | \$322          | \$269    | \$230    | \$201    |
| Two wires   |               | \$217          | \$217    | \$217    | \$217    |
| Three wires   |               | \$326          | \$326    | \$326    | \$326    |
| Four wires  |               | \$436          | \$436    | \$436    | \$411    |
| Five wires  |               | \$521          | \$521    | \$521    | \$521    |
| Six wires   |               | \$653          | \$653    | \$653    | \$653    |
| Seven wires   |               | \$762          | \$762    | \$762    | \$762    |
| Eight wires   |               | \$870          | \$870    | \$870    | \$870    |

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS

#### 11 FOOT ROWS

|   | Cost Per Unit | Vines Per Acre |          |          |          |
|---|---------------|----------------|----------|----------|----------|
|   |               | 792            | 660      | 566      | 495      |
|   |               | Cost Per Acre  |          |          |          |
|   |               | 5' x 11'       | 6' x 11' | 7' x 11' | 8' x 11' |
| 13 end posts per acre with anchor                                     | \$37          | \$481          | \$481    | \$481    | \$481    |
| 13 end posts per acre without anchor                                  | \$29          | \$377          | \$377    | \$377    | \$377    |
| 7' Light T-post (Add 30% for heavy T-post)                            |               |                |          |          |          |
| Every vine  | \$3.50        | \$2,772        | \$2,310  | \$1,981  | \$1,733  |
| Every other vine  | \$1.75        | \$1,386        | \$1,155  | \$991    | \$866    |
| Every third vine  | \$1.17        | \$927          | \$772    | \$662    | \$579    |
| Every fourth vine   | \$.88         | \$697          | \$581    | \$498    | \$436    |
| 8' Vertical line post (13 ga.)  |               |                |          |          |          |
| Every vine  | \$8.48        | \$6,716        | \$5,597  | \$4,800  | \$4,198  |
| Every other vine  | \$4.24        | \$3,358        | \$2,798  | \$2,400  | \$2,099  |
| Every third vine  | \$2.83        | \$2,241        | \$1,868  | \$1,602  | \$1,401  |
| Every fourth vine   | \$2.12        | \$1,679        | \$1,399  | \$1,200  | \$1,049  |
| 4' Rebar or pencil rod at each vine (between T-post or vertical line) | \$.64         |                |          |          |          |
| One rebar between posts   | \$.32         | \$253          | \$211    | \$181    | \$158    |
| Two rebars between posts  | \$.42         | \$333          | \$277    | \$238    | \$288    |
| Three rebars between posts  | \$.48         | \$380          | \$317    | \$272    | \$238    |
| 24" cross-arm (Add 25% for 30" cross-arm)                             |               |                |          |          |          |
| Every vine  | \$1.48        | \$1,172        | \$977    | \$838    | \$733    |
| Every other vine  | \$.74         | \$586          | \$488    | \$419    | \$366    |
| Every third vine  | \$.49         | \$388          | \$323    | \$277    | \$243    |
| Every fourth vine   | \$.37         | \$293          | \$244    | \$209    | \$183    |
| Two wires   |               | \$197          | \$197    | \$197    | \$197    |
| Three wires   |               | \$297          | \$297    | \$297    | \$297    |
| Four wires  |               | \$394          | \$394    | \$394    | \$394    |
| Five wires  |               | \$492          | \$492    | \$492    | \$492    |
| Six wires   |               | \$594          | \$594    | \$594    | \$594    |
| Seven wires   |               | \$692          | \$692    | \$692    | \$692    |
| Eight wires   |               | \$790          | \$790    | \$790    | \$790    |

*(Photographs shown on AH 534.77, page 24 and 25)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### LYRE SYSTEM

#### 11 FOOT ROWS

|  | Cost Per Unit | Vines Per Acre |          |          |          |
|--|---------------|----------------|----------|----------|----------|
|  |               | 792            | 660      | 566      | 495      |
|  |               | Cost Per Acre  |          |          |          |
|  |               | 5' x 11'       | 6' x 11' | 7' x 11' | 8' x 11' |
| 13 end posts per acre with anchor                            | \$37          | \$481          | \$481    | \$481    | \$481    |
| 13 end posts per acre without anchor                         | \$29          | \$377          | \$377    | \$377    | \$377    |
| Heavy steel stake with open lyre cross-arm                   |               |                |          |          |          |
| Every vine   | \$15.90       |                |          |          |          |
| Every other vine   | \$7.95        | \$6,296        | \$5,247  | \$4,500  | \$3,935  |
| Every third vine   | \$5.30        | \$4,198        | \$3,498  | \$3,000  | \$2,624  |
| Every fourth vine  | \$3.98        | \$3,152        | \$2,627  | \$2,253  | \$1,970  |
| 4' Rebar or pencil rod at each vine (between lyre cross-arm) | \$.64         |                |          |          |          |
| One rebar between lyres                                      | \$.32         | \$253          | \$211    | \$181    | \$158    |
| Two rebars between lyres                                     | \$.42         | \$333          | \$277    | \$238    | \$208    |
| Three rebars between lyres                                   | \$.48         | \$380          | \$317    | \$272    | \$238    |
| Six wires  |               | \$594          | \$594    | \$594    | \$594    |
| Seven wires  |               | \$692          | \$692    | \$692    | \$692    |
| Eight wires  |               | \$790          | \$790    | \$790    | \$790    |
| Nine wires   |               | \$887          | \$887    | \$887    | \$887    |
| Ten wires  |               | \$986          | \$986    | \$986    | \$986    |

*(Drawing and photograph shown on AH 534.77, page 26)*



# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### LYRE SYSTEM

#### 12 FOOT ROWS

|  | Cost Per Unit | Vines Per Acre |          |          |          |
|--|---------------|----------------|----------|----------|----------|
|  |               | 726            | 605      | 518      | 454      |
|  |               | Cost Per Acre  |          |          |          |
|  |               | 5' x 12'       | 6' x 12' | 7' x 12' | 8' x 12' |
| 12 end posts per acre with anchor                            | \$37          | \$444          | \$444    | \$444    | \$444    |
| 12 end posts per acre without anchor                         | \$29          | \$348          | \$348    | \$348    | \$348    |
| Heavy steel stake with open lyre cross-arm                   |               |                |          |          |          |
| Every vine   | \$16.00       |                |          |          |          |
| Every other vine   | \$8.00        | \$5,772        | \$4,810  | \$4,118  | \$3,609  |
| Every third vine   | \$5.33        | \$3,848        | \$3,206  | \$2,745  | \$2,406  |
| Every fourth vine  | \$4.00        | \$2,886        | \$2,405  | \$2,060  | \$1,804  |
| 4' Rebar or pencil rod at each vine (between lyre cross-arm) | \$.65         |                |          |          |          |
| One rebar between lyres                                      | \$.32         | \$232          | \$194    | \$166    | \$145    |
| Two rebars between lyres                                     | \$.43         | \$305          | \$254    | \$218    | \$191    |
| Three rebars between lyres                                   | \$.49         | \$348          | \$290    | \$249    | \$218    |
| Six wires  |               | \$543          | \$543    | \$543    | \$543    |
| Seven wires  |               | \$636          | \$636    | \$636    | \$636    |
| Eight wires  |               | \$726          | \$726    | \$726    | \$726    |
| Nine wires   |               | \$816          | \$816    | \$816    | \$816    |
| Ten wires  |               | \$901          | \$901    | \$901    | \$901    |

# VINEYARD STAKES AND TRELLIS SYSTEMS

## MISCELLANEOUS

### COMPONENT COSTS TO CALCULATE COSTS PER ACRE

#### WIRE PRICE PER ACRE

| Based on 10' spacing between rows of vines and 13 gauge wire |       |
|--|-------|
| 2 wire   | \$213 |
| 3 wire   | \$320 |
| 4 wire   | \$427 |
| 5 wire   | \$534 |
| 6 wire   | \$640 |

#### METAL STAKES AND CROSS-ARMS

| T-Post Stakes and Training Stakes |                               | Metal Cross-arms With U Bolts<br>(Medium Grade) |        |
|-----------------------------------|-------------------------------|---|--------|
| 7'                                | .95 lbs/ft \$3.43             | 6"  | \$.73  |
| 7'                                | 1.25 lbs/ft \$4.26            | 12"   | \$.83  |
| 6'                                | .95 lbs/ft \$2.93             | 18"   | \$1.14 |
| 6'                                | 1.25 lbs/ft \$3.64            | 24"   | \$1.46 |
| 5'                                | .95 lbs/ft \$2.44             | 30" to 34"                                      | \$2.08 |
| 4'                                | Rebar Training Stake \$.62    | 36"   | \$2.18 |
| 4'                                | ¼" Steel Training Stake \$.52 | 48"   | \$2.91 |

Heavy duty elaborate galvanized cross-arms can run 40 to 50% more.

#### WOOD STAKES AND CROSS-ARMS

| Stakes |          |                 | Cross-arms With Clips |       | Cross-arms With U-Bolts |                |
|--------|----------|-----------------|-----------------------|-------|-------------------------|----------------|
| 5'     | 1 ¾" sq  | \$1.30          | 12"                   | \$.45 | 12"                     | \$.45 - \$.55  |
| 6'     | 1 ¾" sq  | \$1.60          | 24"                   | \$.60 | 24"                     | \$.75 - \$.90  |
| 7'     | 1 ¾" sq  | \$1.90          | 30"                   | \$.70 | 30"                     | \$.85 - \$.95  |
| 8'     | 3" to 4" | \$3.50 – \$4.50 | 36"                   | \$.85 | 36"                     | \$.95 - \$1.05 |

Price varies with quality

4' Pencil rod and rebar **\$.60 to \$.68** each

T-post with J.R. wire clips

7' heavy T-post: **\$4.55** installed

7' light T-post: **\$3.50** installed

Steel end post with spade

**\$25.00 to \$26.00** each

**\$3.50** install

Vertical line post with wire slots

8' Vertical line post (13 ga): **\$8.48** installed

J.R. clips: **\$.20** each

Screw-in earth anchor

6" x 48" : **\$7.00**

**\$4.50** install

6" x 36" : **\$6.25**

*(Photographs shown on AH 534.77, page 27, 28, and 29)*

7' Deer fence made with 9' T-post and 9' wood stakes

6 ½' woven wire with 2 barbed wires on top and steel gates at drives

Cost: **\$4.40 to \$5.75** per linear foot

*(Photographs shown on AH 534.77, page 30)*

# VINEYARD STAKES AND TRELLIS SYSTEMS

## USEFUL INFORMATION

### WIRE

|          |                             |
|----------|-----------------------------|
| 10 Gauge | 2,060 ft. Per 100 lbs. roll |
| 11 Gauge | 2,580 ft. Per 100 lbs. roll |
| 12 Gauge | 3,370 ft. Per 100 lbs. roll |
| 13 Gauge | 4,470 ft. Per 100 lbs. roll |
| 14 Gauge | 5,860 ft. Per 100 lbs. roll |

### PLANTING SPACING AND WIRE CHART

| Planting Pattern<br>Between Plants—Between Rows | One-Wire System<br>No. of Wire Feet Required<br>Per Acre | No. of Plants Required<br>Per Acre |
|---|--|------------------------------------|
| 3' x 6'   | 7,260'   | 2,420                              |
| 4' x 6'   | 7,260'   | 1,815                              |
| 5' x 6'   | 7,260'   | 1,452                              |
| 6' x 6'   | 7,260'   | 1,210                              |
| 3' x 7'   | 6,222'   | 2,074                              |
| 4' x 7'   | 6,222'   | 1,555                              |
| 5' x 7'   | 6,222'   | 1,245                              |
| 6' x 7'   | 6,222'   | 1,037                              |
| 7' x 7'   | 6,222'   | 889                                |
| 3' x 8'   | 5,445'   | 1,815                              |
| 4' x 8'   | 5,445'   | 1,361                              |
| 5' x 8'   | 5,445'   | 1,089                              |
| 6' x 8'   | 5,445'   | 907                                |
| 7' x 8'   | 5,445'   | 778                                |
| 8' x 8'   | 5,445'   | 681                                |
| 3' x 9'   | 4,850'   | 1,613                              |
| 4' x 9'   | 4,850'   | 1,210                              |
| 5' x 9'   | 4,850'   | 968                                |
| 6' x 9'   | 4,850'   | 807                                |
| 7' x 9'   | 4,850'   | 691                                |
| 8' x 9'   | 4,850'   | 605                                |
| 5' x 10'  | 4,355'   | 871                                |
| 6' x 10'  | 4,356'   | 726                                |
| 7' x 10'  | 4,354'   | 622                                |
| 8' x 10'  | 4,352'   | 544                                |
| 5' x 11'  | 3,960'   | 792                                |
| 6' x 11'  | 3,960'   | 660                                |
| 7' x 11'  | 3,962'   | 566                                |
| 8' x 11'  | 3,960'   | 495                                |
| 5' x 12'  | 3,630'   | 726                                |
| 5½' x 12'                                       | 3,630'   | 660                                |
| 6' x 12'  | 3,630'   | 605                                |
| 7' x 12'  | 3,626'   | 518                                |
| 8' x 12'  | 3,632'   | 454                                |

## VINEYARD STAKES AND TRELLIS SYSTEMS



Sun Maid Southside Dry on Vine Trellis

# VINEYARD STAKES AND TRELLIS SYSTEMS

## TABLE GRAPES

### SINGLE CROSS-ARM



Seven-foot stake and 36" to 42" cross-arm with four wires (13-gauge)



# VINEYARD STAKES AND TRELLIS SYSTEMS

## TABLE GRAPES

### DOUBLE CROSS-ARM



Seven-foot stake, 42" top cross-arm, 24" to 30" lower cross-arm, with six wires (13-gauge)



# VINEYARD STAKES AND TRELLIS SYSTEMS

## TABLE GRAPES/RAISINS

### OPEN GABLE TRELLISES



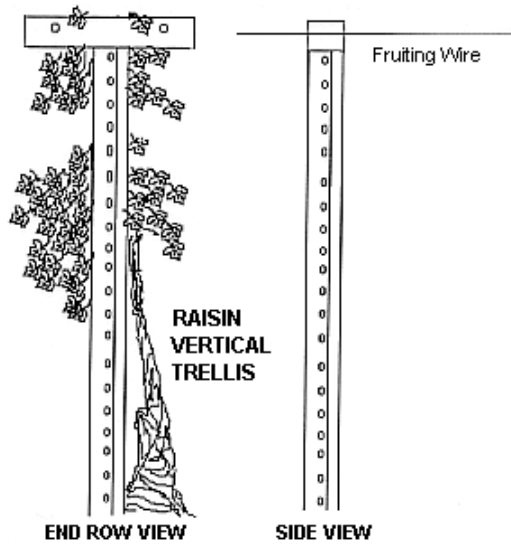
Eight-foot steel post, 4' angle iron on each side of post forming V with the tops approximately 6' to 7' apart, with 3 to 4 wires (13-gauge) on each side



# VINEYARD STAKES AND TRELLIS SYSTEMS

## RAISIN GRAPES

### VERTICAL TRELLIS



Commonly used for raisins with 12' spacing.

**Materials:** 8' wooden end posts with 7' medium T stakes at each vine. A single 24" metal cross-arm with two 13-gauge wires.

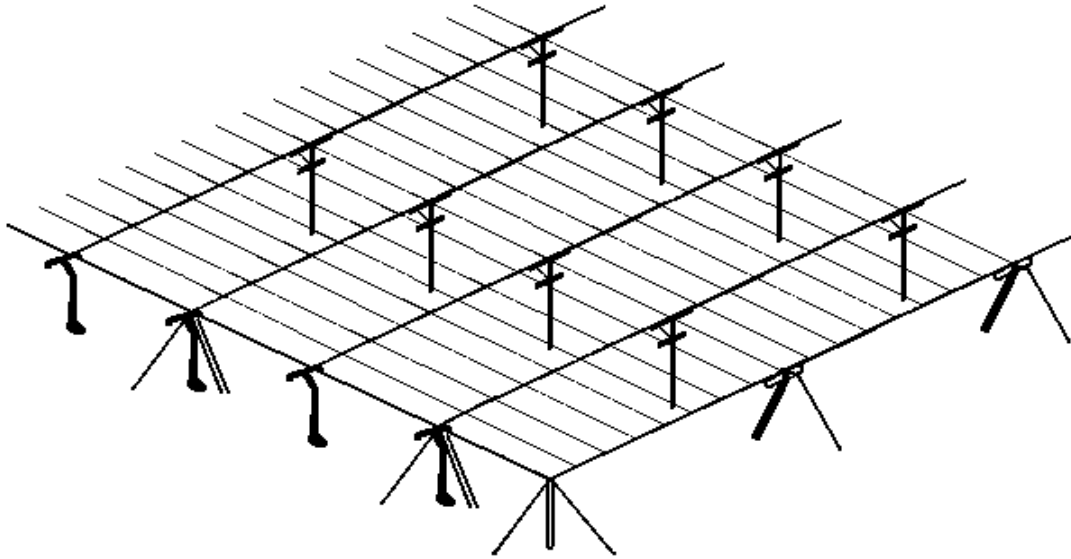




# VINEYARD STAKES AND TRELLIS SYSTEMS

## RAISIN GRAPES

### OVERHEAD DRY ON VINE TRELLIS



Commonly used in 12' row with 6' between vines; occasionally used on 10' and 11' rows; a few 8' and 9' rows.

**Materials:** Wood post 12' on ends, 9' on sides, 10' wood post every third vine with 36" cross-arm, 8 wires per row, and cable support.

# VINEYARD STAKES AND TRELLIS SYSTEMS

## RAISIN GRAPES

### SUN MAID SOUTHSIDE DRY ON VINE TRELLIS



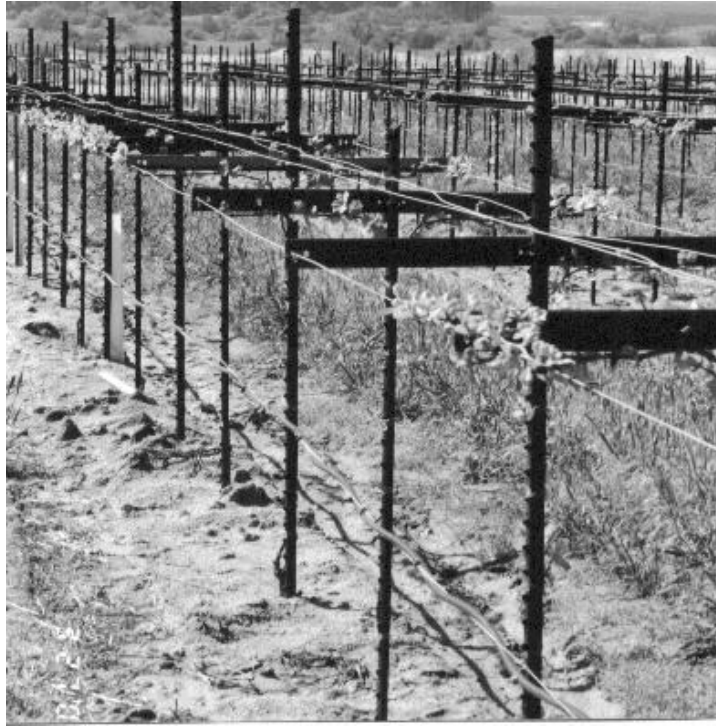
8' T-post every 28' with two 10' cross-arms and 5 wires. In between T-posts are 2 bent 7' to 8' T-posts with 2 wires. Each vine will have a training stake. Each end has a heavy steel post with anchors.



# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS



T-post with cross-arm every vine



T-post and V cross-arm

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### TRELLIS



8' vertical line post with 4' T-posts in between

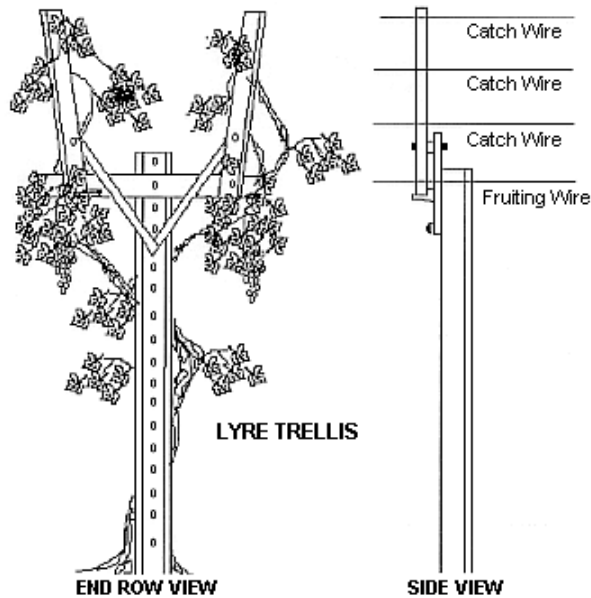


8' vertical line post with light grape stakes in between

# VINEYARD STAKES AND TRELLIS SYSTEMS

## WINE GRAPES

### LYRE TRELLIS



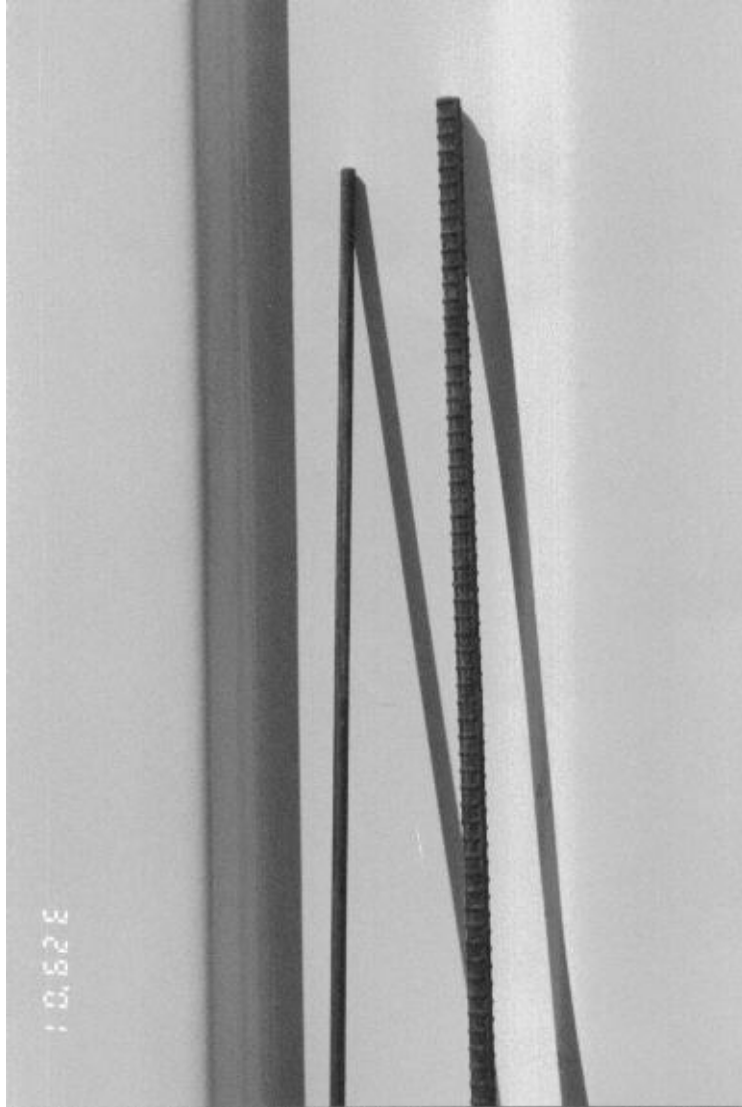
Commonly used in wide row of 11' to 12'.

**Materials:** Heavy steel or wood end posts; heavy and medium T stakes with anchor plates; 8' to 12' gauge wires on metal open Lyre cross-arms with a typical width of 42" at the top; 6 to 10 wires.



# VINEYARD STAKES AND TRELLIS SYSTEMS

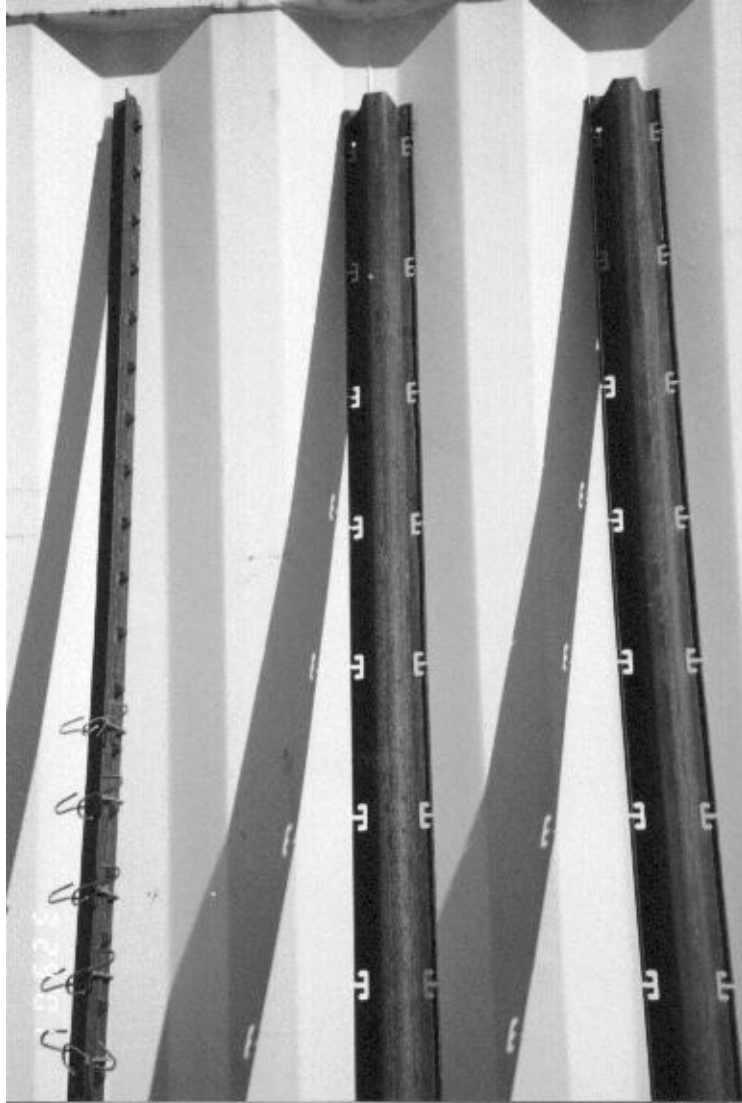
## MISCELLANEOUS



4' Pencil rod and rebar

# VINEYARD STAKES AND TRELLIS SYSTEMS

## MISCELLANEOUS



T-post with J.R. wire clips

7' heavy T-post  
7' light T-post  
J.R. clips



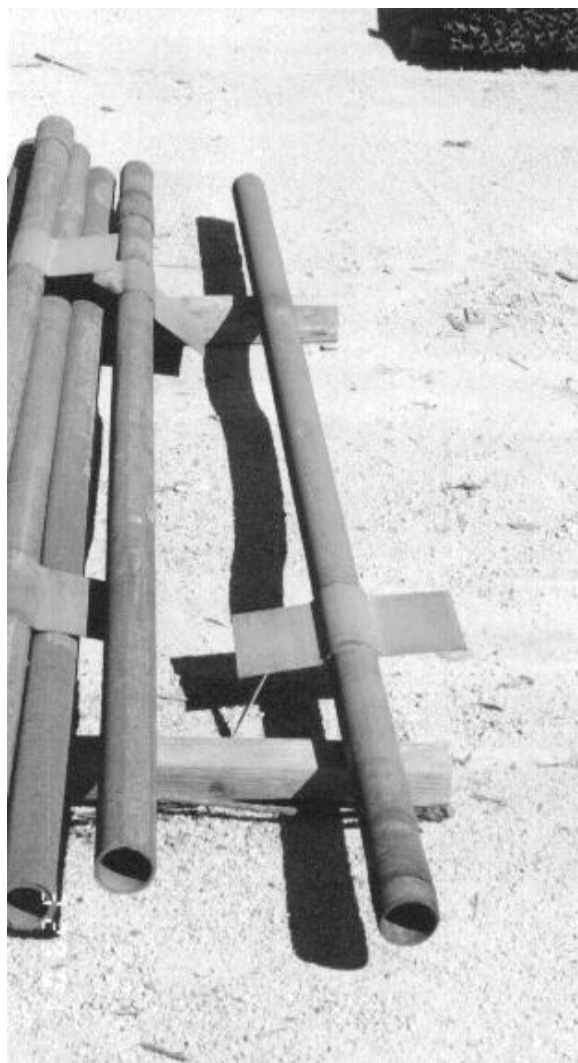
Vertical line post with wire slots

8' Vertical line post (13 ga)

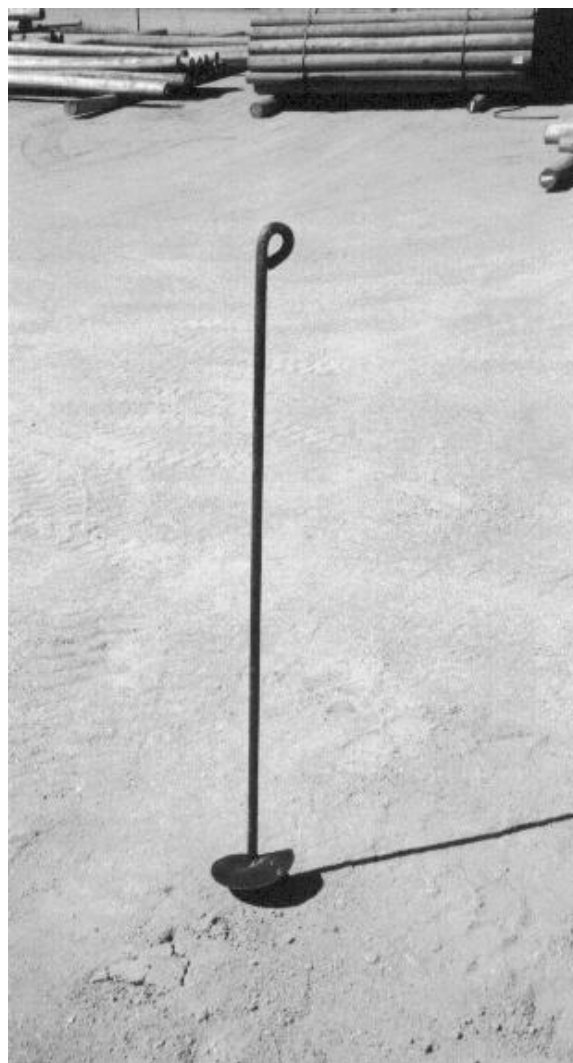


# VINEYARD STAKES AND TRELLIS SYSTEMS

## MISCELLANEOUS



Steel end post with spade



Screw-in earth anchor



# VINEYARD STAKES AND TRELLIS SYSTEMS

## MISCELLANEOUS

### DEER FENCE



7' Deer fence made with 9' T-post and 9' wood stakes  
6 ½' woven wire with 2 barbed wires on top and steel gates at drives



## **AH 534.78: STEEL BUILDINGS**

The *all steel* building serves a variety of functions for the farmer/rancher with its most common use being either storage space for farm machinery or storage of feeds and grains. The typical building as described in this section reflects the cost of a basic building.

In addition, there are instances where the building cost is modified for wall height, partitions, and extra electrical circuits within the structure.

### **BASIC BUILDING COST**

Square-foot costs of basic buildings include the following components:

1. Foundation as required for normal soil conditions.
2. Concrete slab floor, 4 inches to 6 inches thick with wire mesh.
3. A steel building made up of these components:
  - Steel frame or bents, 20, 25, or 30 feet on center.
  - Steel roof purlin, 4 1/2 to 5 1/2 feet on center.
  - Steel wall girts 6 to 7 feet on center.
  - Twenty-six gauge galvanized steel on walls and roof.
  - Window area equal to 2 percent of floor area.
  - Minimal light fixtures—including wiring.
  - One rotary vent per bay.
  - Two walk-in doors.
  - Two overhead or sliding doors.
  - Fourteen-foot eave height.

Basic steel buildings are of two types: the low profile roof pitch (1" in 12") and the more conventional barn-like roof pitch (4" in 12"). The cost differential between the two is considered immaterial for appraisal purposes.

### **ADDITIVE COSTS**

Additive costs are the in-place cost components not included in the basic square-foot cost but are those costs found as part of steel buildings. They are added to the basic building cost to arrive at a total building cost.

# STEEL BUILDINGS

## COST PER SQUARE FOOT

| Length | Width |       |       |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|        | 20'   | 25'   | 30'   | 35'   | 40'   | 45'   | 50'   | 55'   | 60'   | 65'   | 70'   | 80'   |
| 20'    | 30.51 |       |       |       |       |       |       |       |       |       |       |       |
| 25'    | 29.59 | 29.04 |       |       |       |       |       |       |       |       |       |       |
| 30'    | 28.52 | 28.30 | 27.76 |       |       |       |       |       |       |       |       |       |
| 35'    | 27.49 | 27.10 | 26.48 | 25.90 |       |       |       |       |       |       |       |       |
| 40'    | 26.45 | 25.80 | 25.19 | 24.75 | 23.70 |       |       |       |       |       |       |       |
| 50'    | 25.45 | 24.75 | 24.35 | 23.92 | 22.90 | 22.79 | 22.45 |       |       |       |       |       |
| 60'    | 24.80 | 23.95 | 23.25 | 22.95 | 22.49 | 22.21 | 21.92 | 21.80 |       |       |       |       |
| 75'    | 24.53 | 23.60 | 23.11 | 22.55 | 22.14 | 21.80 | 21.51 | 21.19 |       |       |       |       |
| 80'    | 24.04 | 23.19 | 22.60 | 22.10 | 21.80 | 21.35 | 21.05 | 20.63 | 20.15 | 19.60 | 19.05 | 18.79 |
| 90'    | 23.45 | 22.46 | 21.92 | 21.60 | 21.21 | 20.85 | 20.45 | 20.15 | 19.70 | 19.20 | 18.60 | 18.20 |
| 100'   | 22.46 | 22.03 | 21.55 | 20.95 | 20.70 | 20.45 | 19.99 | 19.60 | 19.20 | 18.45 | 17.95 | 17.60 |
| 135'   |       | 21.65 | 20.85 | 20.10 | 19.75 | 19.52 | 19.20 | 19.03 | 18.62 | 18.05 | 17.50 | 17.25 |
| 150'   |       |       |       | 19.50 | 19.01 | 18.70 | 18.41 | 18.30 | 18.05 | 17.80 | 17.30 | 17.03 |
| 175'   |       |       |       | 18.98 | 18.68 | 18.45 | 18.20 | 18.02 | 17.80 | 17.40 | 17.05 | 16.75 |
| 200'   |       |       |       |       | 18.45 | 18.22 | 18.03 | 17.80 | 17.45 | 17.04 | 16.75 | 16.56 |
| 225'   |       |       |       |       |       | 18.02 | 17.80 | 17.45 | 17.00 | 16.80 | 16.60 | 16.40 |
| 250'   |       |       |       |       |       |       | 17.45 | 17.05 | 16.80 | 16.55 | 16.45 | 16.25 |

## ALTERNATE COSTS

Dirt Floor: Due to increased size of footings/foundation, no adjustment for dirt floor.

Wall Height: Add or subtract 3% per square foot from basic cost for each foot of variation above or below the basic 14-foot eave height.

Missing Wall Cover: Deduct **\$2.00** for each square foot of missing wall area.

Electrical Power: Deduct **\$1.60 - \$2.10** per square foot for lack of power.

The above costs are for 26 gauge steel cover.

# STEEL BUILDINGS

## ADDITIVE COSTS

The cost of additives, such as doors and windows, that replace a portion of the exterior skin of the building, reflects the net added cost of the component in-place. The cost of the skin that is replaced has been deducted from the total cost of the additive components. No further deduction is necessary.

### OVERHEAD DOORS WITH CHAIN HOIST OPENERS

| Width | Height |         |         |         |         |
|-------|--------|---------|---------|---------|---------|
|       | 8'     | 10'     | 12'     | 14'     | 16'     |
| 8'    | \$940  | \$1,000 | \$1,090 | \$1,210 |         |
| 10'   | 970    | 1,050   | 1,165   | 1,365   | \$1,563 |
| 12'   | 1,060  | 1,160   | 1,312   | 1,501   | 1,700   |
| 14'   | 1,300  | 1,370   | 1,564   | 1,701   | 2,079   |
| 16'   | 1,430  | 1,570   | 1,795   | 2,100   | 2,331   |
| 18'   | 1,730  | 1,870   | 2,100   | 2,331   |         |

### WALK-IN DOORS

|               |                |
|---------------|----------------|
| Flush 3' x 7' | \$500 to \$600 |
| Half Glass    | \$550 to \$650 |

### ROTARY VENTS

|     |       |
|-----|-------|
| 20" | \$265 |
|-----|-------|

### RIDGE VENTS

|           |       |
|-----------|-------|
| 9" x 10'  | \$433 |
| 12" x 10' | \$459 |

### GUTTERS AND DOWNSPOUTS

|                 |                  |
|-----------------|------------------|
| Per linear foot | \$4.59 to \$6.65 |
|-----------------|------------------|

### SKYLIGHTS

|          |               |
|----------|---------------|
| 3' x 10' | \$82 to \$102 |
|----------|---------------|

### WINDOWS

|         |       |
|---------|-------|
| 3' x 3' | \$148 |
| 3' x 6' | 174   |
| 4' x 6' | 235   |
| 4' x 8' | 286   |

# STEEL BUILDINGS

## ADDITIVE COSTS

### HEATING

| Overhead Suspended Unit | Cost Per Unit |
|-------------------------|---------------|
| 75,000 BTU              | \$1,365       |
| 100,000 BTU             | 1,627         |
| 200,000 BTU             | 2,205         |
| 300,000 BTU             | 2,625         |

### RESTROOMS

|  | Total Cost        |
|--|-------------------|
| Cost includes 2 fixtures, electrical service, and all partitions. Add for septic tank. | \$6,600 - \$8,175 |

### OFFICE AREAS

|  | Square Foot |
|--|-------------|
| Cost includes partitioning, interior finish, trim, and doors | \$56 - \$73 |

### PARTITIONS

|                            | Per Square Foot of Wall Area |
|----------------------------|------------------------------|
| Drywall on wood frame      | \$3.57                       |
| Plaster on wood frame      | \$5.10                       |
| Paneling (average quality) | \$4.05 - \$5.10              |

### INSULATION

|      | Square Foot   |
|------|---------------|
| R-13 | \$.66 - \$.77 |
| R-6  | \$.50 - \$.55 |

# STEEL BUILDINGS



## AH 534.79: MISCELLANEOUS COSTS

### PIT TYPE MOTOR TRUCK SCALES WITH CONCRETE DECK

| Scales        |               |            | Scale Pit  |               |                    |
|---------------|---------------|------------|------------|---------------|--------------------|
| Tons Capacity | Platform Size | Total Cost | Size       | Standard Cost | Add for: 12' Width |
| 20            | 25' x 10'     | \$ 11,000  | 25' x 10'  | \$ 11,000     | 900                |
| 30            | 25' x 10'     | 11,800     | 40' x 10'  | 14,400        | 1,000              |
| 50            | 40' x 10'     | 18,300     | 50' x 10'  | 16,000        | 1,100              |
| 50            | 50' x 10'     | 19,300     | 60' x 10'  | 17,850        | 1,300              |
| 60            | 60' x 10'     | 21,630     | 70' x 10'  | 18,480        | 1,500              |
| 60            | 70' x 10'     | 25,935     | 80' x 10'  | 19,950        | 2,100              |
| 60            | 80' x 10'     | 29,295     | 90' x 10'  | 21,735        |                    |
| 80            | 80' x 10'     | 35,700     | 90' x 10'  | 23,612        |                    |
| 100           | 90' x 10'     | 39,585     | 100' x 10' | 25,725        |                    |

**Pitless above-ground scales, deduct 25% from above prices**

**Used scales, deduct 25 to 40%**

### ADD FOR WEIGHT RECORDING EQUIPMENT

|                      |         |
|----------------------|---------|
| Electronic indicator | \$1,060 |
| Ticket printer       | \$1,060 |

### EXAMPLE OF MOTOR TRUCK SCALE COST

|   |              |
|---|--------------|
| Scales: 80 ton capacity, 80' x 10' platform     | \$34,000     |
| Scale Pit: 90' x 10' size, standard             | 19,000       |
| Electric weight recording equipment and printer | <u>2,000</u> |
| Total   | \$55,000     |

*(Photograph shown on AH534.79, page 10)*

### ELEVATED HOPPER TANK – Steel Support Legs, Stiffened Side Walls, Ladder, Roof Access Door, includes Concrete Base

| Size     | Cost     |
|----------|----------|
| 80 Tons  | \$11,752 |
| 100 Tons | 14,872   |
| 130 Tons | 17,472   |
| 160 Tons | 20,072   |
| 200 Tons | 24,024   |
| 235 Tons | 26,624   |
| 300 Tons | 34,112   |
| 350 Tons | 42,120   |
| 400 Tons | 47,008   |

## MISCELLANEOUS COSTS

### CONCRETE HORIZONTAL OR FLAT STORAGE

| Cwt     | Cost per Cwt |
|---------|--------------|
| 28,000  | \$4.15       |
| 42,000  | 3.99         |
| 56,000  | 3.83         |
| 85,000  | 3.65         |
| 110,000 | 3.50         |
| 140,000 | 3.38         |
| 200,000 | 3.28         |
| 400,000 | 2.86         |
| 600,000 | 2.73         |

### ABOVE-GROUND FUEL TANKS & CONTAINMENT SYSTEMS

#### PREFABRICATED CONCRETE FUEL CONTAINMENT TUBS

|                                   |         |
|-----------------------------------|---------|
| 400 gallon capacity containment   | \$892   |
| 500 gallon capacity containment   | \$1,155 |
| 1,000 gallon capacity containment | \$1,680 |

#### CONTAINMENT WITH TANK AND ELECTRIC PUMPS

|                         |         |
|-------------------------|---------|
| 500 gallon – diesel     | \$4,200 |
| 1,000 gallon – diesel   | \$5,722 |
| 500 gallon – gasoline   | \$5,040 |
| 1,000 gallon – gasoline | \$6,615 |

#### ABOVE-GROUND FUEL TANKS (Steel Tanks with Thick Outer Shell of Concrete)

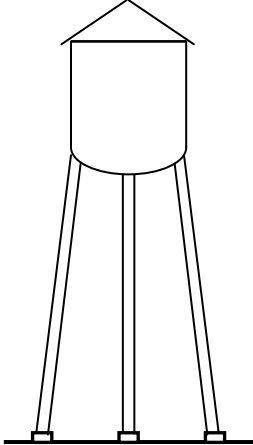
| Gallons  | Cost                 |
|--|----------------------|
| 500, with electric pump  | \$ 7,590 to \$ 8,630 |
| 1,000, with electric pump  | \$10,400 to \$11,960 |
| 2,000, with electric pump  | \$15,435 to \$17,368 |
| Double unit—(1) 1,000 gallon, (1) 500 gallon with 2 electric pumps | \$11,440 to \$12,480 |

*(Photographs shown on AH 534.79, page 10)*

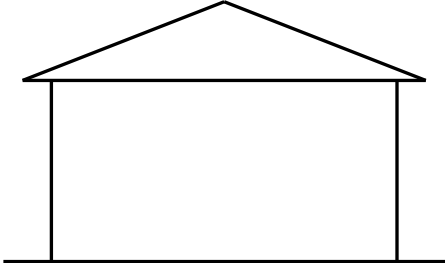


# MISCELLANEOUS COSTS

## ELEVATED STEEL WATER STORAGE TANKS

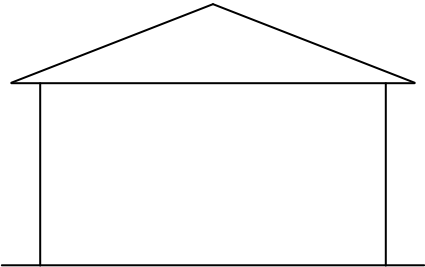
|  | Gallon Capacity | Total Cost of 75' Tower and Tank | Total Cost of 100' Tower and Tank |
|---|-----------------|----------------------------------|-----------------------------------|
|   | 25,000          | \$237,000                        | \$273,000                         |
|   | 30,000          | 254,000                          | 291,000                           |
|   | 40,000          | 267,000                          | 299,000                           |
|   | 50,000          | 276,000                          | 314,000                           |
|   | 60,000          | 288,000                          | 328,000                           |
|   | 75,000          | 306,800                          | 346,000                           |
|   | 100,000         | 354,640                          | 374,000                           |
|   | 150,000         | 450,320                          | 480,480                           |
|   | 200,000         | 557,440                          | 589,680                           |
|   | 300,000         | 693,680                          | 747,760                           |
|   | 500,000         | 931,840                          | 996,320                           |
|   | 1,000,000       | 1,546,480                        | 1,707,680                         |

## WELDED STEEL WATER STORAGE TANKS ON GROUND WITH FOUNDATION

|  | Gallon Capacity | Total Cost of Tank on Ground |
|---|-----------------|------------------------------|
|   | 25,000          | \$46,500                     |
|   | 30,000          | 52,500                       |
|   | 40,000          | 60,000                       |
|   | 50,000          | 72,000                       |
|   | 60,000          | 81,120                       |
|   | 75,000          | 96,720                       |
|   | 100,000         | 110,080                      |
|   | 150,000         | 138,320                      |
|   | 200,000         | 157,040                      |
|   | 300,000         | 196,560                      |
|   | 500,000         | 278,200                      |
|   | 1,000,000       | 431,600                      |

# MISCELLANEOUS COSTS

## BOLTED STEEL WATER TANKS

|  | Gallon Capacity | Total Cost of Tank on Ground |
|---|-----------------|------------------------------|
|   | 10,000          | \$15,500                     |
|   | 20,000          | 22,500                       |
|   | 30,000          | 28,000                       |
|   | 50,000          | 36,000                       |
|   | 75,000          | 43,000                       |
|   | 100,000         | 49,350                       |
|   | 125,000         | 58,275                       |
|   | 150,000         | 70,875                       |
|   | 200,000         | 84,000                       |

Price varies due to gauge, height, diameter, and delivery costs.  
Price typically includes crushed rock base or concrete on longer tanks.

## POLYETHYLENE OR FIBERGLASS TANKS (Used for Ag Chemicals or Liquid Fertilizers)

| Capacity (Gallons) | Cost   |
|--------------------|--------|
| 1,000              | \$ 980 |
| 2,000              | 1,800  |
| 3,000              | 2,750  |
| 4,000              | 3,500  |
| 5,000              | 4,488  |
| 6,000              | 5,202  |
| 8,000              | 6,732  |
| 10,000             | 8,058  |

Add **\$4.00** per square foot for concrete base

**Polyethylene water only tanks, deduct 20% from above prices.**

# MISCELLANEOUS COSTS

## STEEL GRAIN BINS

Sacramento and Northern California

Steel grain bins are used for storage and drying of small grains. The typical storage bin has metal walls and roof, a concrete floor and foundation. The drying bin is of similar construction with a dryer floor, unloading auger, and leveler. Dryer fan, heater unit, and motor are also considered part of the drying bin.

### GRAIN DRYING BINS

| Diameter | Eave Heights |        |        |        |        |        |
|----------|--------------|--------|--------|--------|--------|--------|
|          | 16'          | 18'    | 21'    | 24'    | 32'    | 40'    |
| 18'      | 17,580       | 18,500 | 19,400 | 22,496 | 27,348 | 31,588 |
| 21'      | 20,050       | 20,800 | 21,750 | 26,028 | 32,076 | 35,748 |
| 24'      | 22,900       | 23,750 | 25,000 | 30,078 | 36,936 | 40,932 |
| 27'      | 27,600       | 28,500 | 30,100 | 36,288 | 44,982 | 47,790 |
| 30'      | 30,750       | 32,050 | 33,850 | 39,906 | 49,140 | 54,540 |
| 36'      | 40,700       | 42,600 | 44,500 | 52,488 | 62,424 | 70,848 |
| 42'      | 50,250       | 51,900 | 53,650 | 68,040 | 78,192 | 91,260 |
| 48'      | 64,450       | 68,350 | 72,400 | 84,024 | 95,634 | 99,846 |

Includes cost of foundation, perforated floor, unloading auger, aeration unit, fan, dryer, and stirring devices.

### GRAIN STORAGE BINS

| Diameter | Eave Heights |        |        |        |        |        |        |         |         |
|----------|--------------|--------|--------|--------|--------|--------|--------|---------|---------|
|          | 16'          | 18'    | 21'    | 24'    | 32'    | 40'    | 48'    | 58'     | 64'     |
| 18'      | 10,350       | 10,500 | 11,650 | 13,800 | 18,000 | 22,631 | 26,129 |         |         |
| 21'      | 11,750       | 12,200 | 13,400 | 16,100 | 21,000 | 25,864 | 30,422 |         |         |
| 24'      | 14,250       | 14,900 | 15,550 | 19,100 | 23,950 | 30,157 | 35,192 | 41,976  | 46,640  |
| 27'      | 16,250       | 17,600 | 19,750 | 23,350 | 30,450 | 35,881 | 43,513 | 52,364  | 57,770  |
| 30'      | 18,300       | 19,600 | 22,450 | 25,300 | 33,050 | 40,174 | 47,700 | 59,731  | 67,151  |
| 36'      | 24,500       | 25,900 | 28,700 | 32,900 | 42,000 | 51,940 | 62,434 | 77,221  | 85,648  |
| 42'      | 30,700       | 32,000 | 33,450 | 44,000 | 52,950 | 68,052 | 79,818 | 96,142  | 106,636 |
| 48'      | 42,500       | 46,000 | 50,100 | 56,870 | 65,650 | 83,708 | 93,280 | 113,367 | 124,762 |

Includes cost of bin foundation, door, ladder, and unloading auger.

**ADD FOR:** Roof Augers **\$800 to \$1,500** (depends on length—13' to 24')  
Fan **\$1,700** (5 H.P.) to **\$3,100** (25 H.P.)

*(Photographs shown on AH 534.79, page 11)*

### PERFORATED FLOORS

| 18'     | 21'     | 24'     | 27'     | 30'     | 36'     | 42'     | 48'      |
|---------|---------|---------|---------|---------|---------|---------|----------|
| \$2,550 | \$2,754 | \$3,468 | \$4,182 | \$5,202 | \$7,242 | \$9,282 | \$11,322 |

## MISCELLANEOUS COSTS

### 2-INCH REDWOOD WATER STORAGE TANKS

| Gallons | Diameter | Height | Cost    |
|---------|----------|--------|---------|
| 500     | 5'       | 4'     | \$2,950 |
| 1,000   | 6'       | 6'     | 3,700   |
| 1,500   | 7'       | 6'     | 4,500   |
| 2,000   | 8'       | 6'     | 5,575   |
| 3,000   | 10'      | 6'     | 7,150   |
| 4,000   | 10'      | 8'     | 8,600   |
| 5,000   | 11'      | 8'     | 9,800   |
| 6,000   | 12'      | 8'     | 11,500  |
| 7,000   | 11'      | 10'    | 12,600  |
| 8,000   | 12'      | 10'    | 13,250  |
| 9,000   | 13'      | 10'    | 14,200  |
| 10,000  | 14'      | 10'    | 15,650  |
| 12,000  | 15'      | 10'    | 17,450  |
| 15,000  | 14'      | 14'    | 19,300  |

Above costs include chime joists, covers, foundation, and all labor, set up, and transportation charges.

**ADD FOR:** Ladders                      **\$40** per linear foot  
                  Water level registers    **\$15** per linear foot of tank height  
                  Cone covers                   **\$1,000 to \$2,800** per tank

## MISCELLANEOUS COSTS

### 3-INCH REDWOOD WATER STORAGE TANKS

| Gallons | Diameter | Height | Cost     |
|---------|----------|--------|----------|
| 10,000  | 14'      | 10'    | \$22,000 |
| 12,000  | 14'      | 12'    | 25,300   |
| 15,000  | 16'      | 12'    | 27,100   |
| 20,000  | 18'      | 12'    | 34,900   |
| 25,000  | 17'      | 16'    | 37,800   |
| 30,000  | 20'      | 14'    | 44,000   |
| 40,000  | 23'      | 14'    | 55,400   |
| 50,000  | 24'      | 16'    | 62,200   |
| 60,000  | 26'      | 16'    | 69,800   |
| 70,000  | 28'      | 16'    | 74,200   |
| 75,000  | 29'      | 16'    | 84,200   |
| 80,000  | 30'      | 16'    | 90,800   |
| 90,000  | 30'      | 18'    | 95,500   |
| 100,000 | 32'      | 18'    | 100,800  |
| 150,000 | 37'      | 20'    | 135,000  |
| 200,000 | 43'      | 20'    | 160,000  |

Above costs include typical foundation, chime joists, tank cover, and all labor, set up, and transportation charges.

### CYLINDRICAL 3-INCH REDWOOD WINE TANKS

| Gallons Capacity | Base Price |
|------------------|------------|
| 1,000            | \$5,100    |
| 1,500            | 6,500      |
| 2,000            | 7,600      |
| 2,500            | 9,000      |
| 3,000            | 10,700     |
| 4,000            | 11,500     |
| 5,000            | 14,000     |
| 7,500            | 17,300     |
| 10,000           | 19,100     |
| 15,000           | 26,600     |
| 20,000           | 35,000     |
| 25,000           | 38,000     |
| 30,000           | 45,000     |

Base price includes 4" x 6" chime joists, 1/2' galvanized hoops, recessed head cover, side door with galvanized T-bolt.

## MISCELLANEOUS COSTS

### STAINLESS STEEL WINE TANKS

| Gallons Capacity | Cost     |
|------------------|----------|
| 1,000            | \$ 9,373 |
| 2,000            | 13,339   |
| 3,000            | 15,141   |
| 4,000            | 16,892   |
| 5,000            | 17,098   |
| 10,000           | 24,910   |
| 20,000           | 39,655   |
| 50,000           | 62,109   |
| 100,000          | 93,305   |
| 200,000          | 170,988  |

Cost includes all valves, temperature controls, vents, and cooling jackets for tanks with a capacity of 20,000 gallons or less. The cost on tanks of 50,000 gallons or more excludes cooling jackets.

### CYLINDRICAL 2 INCH OAK TANKS

| Gallons Capacity | Base Price |
|------------------|------------|
| 500              | \$2,257    |
| 750              | 3,307      |
| 1,000            | 4,305      |
| 1,250            | 5,250      |
| 1,500            | 6,090      |
| 2,000            | 8,610      |
| 2,500            | 9,922      |
| 3,000            | 11,340     |
| 4,000            | 15,225     |
| 5,000            | 18,270     |
| 6,000            | 22,050     |

Base price includes 4" x 6" chime joists, galvanized hoops, head supports with stainless steel head bolts, side door with stainless T-bolt, installation in Sonoma County. Foundations not included.

# MISCELLANEOUS COSTS

## PREFABRICATED METAL SHADES

### SPECIFICATIONS

|                        |   |
|------------------------|---|
| Foundation             | Metal base plate with tie downs                                     |
| Floor                  | Dirt  |
| Wall/Roof Frame        | 2 3/8" galvanized structural tubing (4' on center) 7' to 9' eaves   |
| Roofing                | 29-gauge steel with baked on enamel (extends 6" to 12" below eaves) |
| Exterior Wall Covering | None  |

*(Photograph shown on AH534.79, page 11)*

### COMMON SIZES

|           |         |           |         |
|-----------|---------|-----------|---------|
| 12' x 21' | \$1,200 | 20' x 21' | \$2,050 |
| 12' x 26' | 1,450   | 20' x 26' | 2,450   |
| 12' x 31' | 1,900   | 20' x 31' | 3,050   |
| 12' x 36' | 2,150   | 20' x 36' | 3,600   |
| 12' x 41' | 2,450   | 20' x 41' | 4,000   |

### RV SHADES

|                 |         |
|-----------------|---------|
| 14' x 30' x 12' | \$3,744 |
| 14' x 40' x 12' | 4,940   |

### ADDITIVES

- Add 6% to above prices for 26-gauge steel roofing
- 29-gauge metal wall covering—**\$1.25** per square foot of wall (standard roofing extends 6" to 12" below eaves)
- Back enclosure kit:
  - 12-foot wide — **\$468**
  - 20-foot wide — **\$624**
  - 24-foot wide — **\$832**
- Front enclosure kit with opening for roll-up door:
  - 12-foot wide — **\$364**
  - 20-foot wide — **\$416**
- Light duty roll-up doors
  - 8' x 6' — **\$312**
  - 9' x 7' — **\$364**
  - 10' x 8' — **\$416**
  - 10' x 10' — **\$468**
- Walk-thru door 32" x 72" — **\$208 to \$260**
- Add 3% for each additional foot of wall height above 8 feet
- Concrete floor—**\$4.16 to \$5.20** per square foot
- Windows 30" x 30" — **\$130**

## MISCELLANEOUS COSTS

### PIT TYPE MOTOR TRUCK WITH CONCRETE DECK



### ABOVE-GROUND FUEL TANK (Steel Tank with Thick Outer Shell of Concrete)





# MISCELLANEOUS COSTS

## STEEL GRAIN BINS



# MISCELLANEOUS COSTS

## PREFABRICATED METAL SHADES



## AH 534.80: WIND MACHINES

### NEW

New machines will average a physical life of 30 years. Typical usage will average 100 - 150 hours per year. Each wind machine will service approximately 10 acres.

#### WIND MACHINES

| Model                               | Cost     |
|-------------------------------------|----------|
| G.P. 359 Cummins Diesel             | \$22,500 |
| 130 HP Ford V-10 L.P.G.             | \$20,250 |
| 130 HP Ford 460 L.P.G.              | \$17,900 |
| 115 HP John Deere 6068 Diesel       | \$22,300 |
| 100 HP Electric                     | \$16,100 |
| 75 HP Electric                      | \$15,600 |
| Portable Low Crop 115 HP John Deere | \$21,800 |
| Portable Low Crop V-10 Ford L.P.G.  | \$21,300 |

Tower height for above machines is 36 feet.

#### OPTIONS

| Item                    | Cost    |
|-------------------------|---------|
| 41 Foot Tower           | \$850   |
| Auto Thermostat Control | \$3,000 |
| Variable Speed Rotation | \$1,500 |
| Contour Assembly        | \$3,800 |

Above prices include foundation and installation.

### USED

#### USED GAS & \*PROPANE MACHINES

| HP      | Model           | Cost    |
|---------|-----------------|---------|
| 223-6   | Gasoline 68 HP  | \$4,080 |
| 240-6   | Gasoline 68 HP  | \$4,590 |
| 292-V-8 | Gasoline 86 HP  | \$5,610 |
| 332-V-8 | Gasoline 86 HP  | \$5,610 |
| 300-6   | Gasoline 92 HP  | \$6,120 |
| 391-V-8 | Gasoline 100 HP | \$7,140 |
| 391-V-8 | Gasoline 125 HP | \$7,650 |
| 460-V-8 | Gasoline 125 HP | \$9,180 |

\* All the above machines can be converted to propane if desired. Cost will be **\$600** additional for each motor.

# WIND MACHINES

## USED

### USED ELECTRIC MACHINES

| HP      | Model                        | Cost    |
|---------|------------------------------|---------|
| 12 1/2* | Frostmaster                  | \$1,500 |
| 12 1/2* | Tropic Breeze                | \$1,500 |
| 25*     | Frostmaster (Wood Fan)       | \$2,500 |
| 25*     | Frostmaster (Metal Fan)      | \$2,500 |
| 25*     | Tropic Breeze                | \$2,500 |
| 35*     | Frostmaster                  | \$2,700 |
| 40*     | Tropic Breeze 900 RPM        | \$3,500 |
| 40*     | Tropic Breeze Teeter Hub Fan | \$3,500 |
| 50*     | Tropic Breeze 900 RPM        | \$4,000 |
| 50*     | Tropic Breeze Teeter Hub Fan | \$4,000 |
| 60*     | Tropic Breeze 900 RPM        | \$4,500 |
| 60*     | Tropic Breeze Teeter Hub Fan | \$4,500 |
| 75      | Tropic Breeze 900 RPM        | \$4,500 |
| 75      | Tropic Breeze Teeter Hub Fan | \$4,500 |
| 100     | Tropic Breeze 900 RPM        | \$5,250 |
| 100     | Tropic Breeze Teeter Hub Fan | \$5,250 |
| 125     | Tropic Breeze 900 RPM        | \$6,700 |
| 125     | Tropic Breeze Teeter Hub Fan | \$7,000 |

The cost of used wind machines can vary widely depending upon the age and condition of the equipment.

### DIESEL MACHINES (REBUILT ENGINES)

|               |            |                 |         |
|---------------|------------|-----------------|---------|
| 330 Ford *    | 6 Cylinder | Diesel - 81 HP  | \$8,160 |
| 363 Ford *    | 6 Cylinder | Diesel - 100 HP | \$9,180 |
| 378 Cummins * | V-6        | Diesel - 125 HP | \$9,180 |

The above prices include a 550 gallon above-ground fuel tank. Larger tanks are available on request at additional cost.

\* No longer manufactured

# WIND MACHINES

## RECONDITIONED

### RECONDITIONED ELECTRIC MACHINES

| Model  |                         | Cost    |
|--------|-------------------------|---------|
| 100 HP | Phoenix                 | \$5,985 |
| 100 HP | Tropic Breeze PODS      | \$5,985 |
| 75 HP  | Tropic Breeze PODS      | \$5,250 |
| 75 HP  | Tropic Breeze D. Flange | \$5,250 |
| 50 HP  | 900 RPM                 | \$5,250 |

### RECONDITIONED GROUND POWERED TROPIC BREEZE

| Model     |                    | Cost     |
|-----------|--------------------|----------|
| 292 HP    | Ford, Propane      | \$7,350  |
| 332 HP    | Ford, Propane      | \$7,035  |
| 300 HP    | Ford, Propane      | \$8,400  |
| 391 HP    | Ford, Propane      | \$9,450  |
| 460 HP    | Ford, Propane      | \$10,500 |
| In Line 6 | John Deere, Diesel | \$13,125 |
| In Line 6 | Cummins, Diesel    | \$12,600 |
| V-6       | Cummins, Diesel    | \$11,025 |

### RECONDITIONED EOT

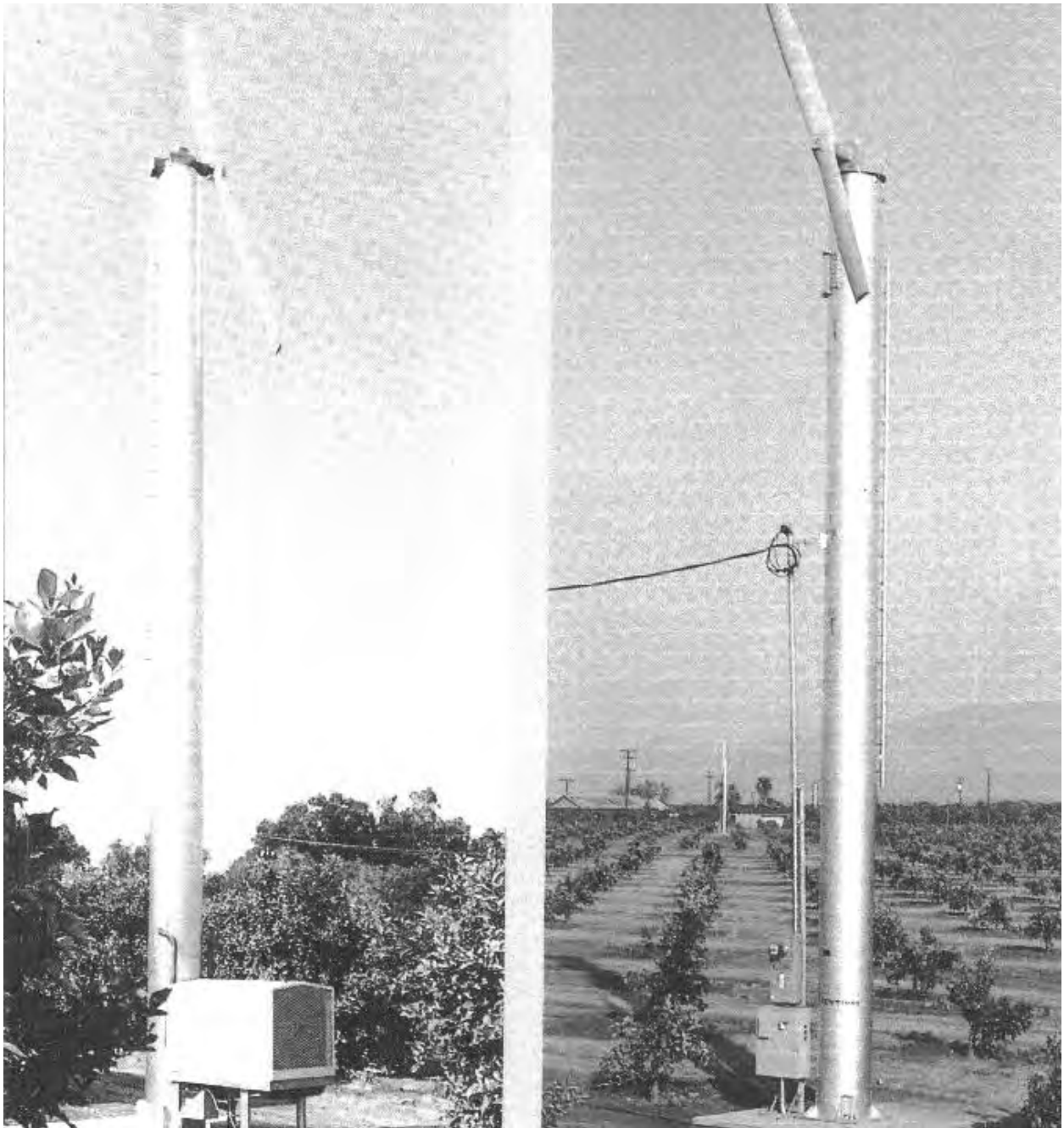
| Model  |               | Cost    |
|--------|---------------|---------|
| 223 HP | Ford, Gas     | \$4,200 |
| 292 HP | Ford, Propane | \$5,250 |
| 391 HP | Ford, Propane | \$8,400 |
| 460 HP | Ford, Propane | \$9,712 |

NOTE: All used costs listed above include foundation and installation.

### ABBREVIATIONS

|        |                   |
|--------|-------------------|
| GP     | Ground Power      |
| RT     | Rotating Tower    |
| TT     | Tall Tower        |
| ST-ROT | Standard Rotation |
| SP-ROT | Special Rotation  |
| LC     | Low Crop          |
| S      | Single            |
| D      | Dual              |
| EOT    | Engine on Tower   |
| SC     | Special Contour   |

## WIND MACHINES



# AH 534.90: DEPRECIATION

## DEFINITIONS

An essential part of the cost approach is the estimation of depreciation, and the usefulness of this approach depends greatly upon the appraiser's ability to make this estimate. This discussion is confined to the application of normal percent good factors to replacement cost new to arrive at replacement cost less normal depreciation. A more detailed discussion of depreciation may be found in Assessors' Handbook Section 501, *Basic Appraisal*.

### PERCENT GOOD TABLES

*Accrued depreciation* is considered to be the difference between replacement cost new and current value.

*Percent good* is the complement of accrued depreciation. If accrued depreciation is 20 percent, percent good is 80 percent. The percent good concept is used because it saves one arithmetic operation in calculating replacement cost new less normal depreciation.

In a mass appraisal program, speed and uniformity in depreciation estimates are accomplished by the use of normal percent good tables. Percent good factors reflect the average loss in value that improvements suffer over time from normal or usual causes. They include normal physical deterioration and normal functional obsolescence, but they do not include value losses caused by unusual physical deterioration, unusual functional obsolescence, or economic obsolescence.

There are two types of normal percent good tables for structures. They are designated as "R" and "OR" tables. "R" tables are generally applicable to residential-type buildings, and "OR" tables are applicable to "other-than-residential" buildings. For each of the two types there are a number of different tables for buildings with various life expectancies

Individual tables are designated as type "R" or "OR," with a total life expectancy in years. For example, the proper table for an average-quality dairy barn with a 20-year total life expectancy is designated as "R-20."

### AVERAGE LIFE TABLES

Average life tables direct the appraiser to the proper normal percent good table. This selection is based upon the following three factors:

- Use type
- Construction type
- Quality

Use type refers to the use that is currently being made of the improvement. It may or may not be the same as the original design type that the building cost is based upon.

Construction type and quality classification are based upon the same standards as those set forth in the standard classification system for these two building characteristics.

## **REMAINING LIFE EXPECTANCY TABLES**

Remaining life expectancy tables are also included with the normal depreciation tables. These tables show a remaining life expectancy for an item at each age of its life. These tables are intended as general information for the appraiser and may or may not be applicable in a specific instance.

## **EXTENDED LIFE CONCEPT**

The percent good tables incorporate an extended life concept. In this concept, percent good and remaining life expectancy are based upon the expectancy at any age of a surviving item of a larger original group. Thus, a given item that has a probable life expectancy of 20 years when new may have some remaining life, and therefore value, when it is 20 years old. This stems from the fact that the 20-year average life for the group is attained by the early retirement of some items and the later retirement of others.

## **EFFECTIVE YEAR**

Two items must be known in order to select the proper normal percent good of a structure from the table—the average life and the age of the structure. The average life is obtained from the "average-life table," and the age is calculated by subtracting the *effective year* (see next paragraph) from the appraisal year. Normal percent good and remaining life can be found from the table by selecting the age in years from the age column and reading horizontally to the proper average life column.

In most buildings the effective year is the same as the year of construction. Changes in effective year should not be made unless a significant change has been made in the improvement. However, when a building has been remodeled or added to, or is not architecturally representative of its date of original construction, the effective year may differ from the actual year of construction.

The assignment of an effective year is an appraisal estimate rather than a mechanical calculation. Knowledge of architectural and functional characteristics of structures and the changes in these characteristics over time is the key to estimating the effective year of structures. These characteristics cause structures to fall into eras or age groups. Age groups may be identified by the appraiser, and a year that most nearly reflects the effective age of a structure is assigned.

## **PHYSICAL CONDITION**

While the value of a building may vary considerably with its condition, effective year changes are not generally made as a result of condition. Normal percent good computations are based on the assumption that the building is in average condition for its age.



While the condition of a building does have a significant influence on its value, the effective year is not generally changed for this reason because it is a temporary situation relative to total building life. Building conditions may vary considerably in a short period of time; for example, a building may be in poor condition one year, completely renovated the next year, and then allowed to deteriorate again. Effective year changes should be reserved for permanent situations.

Value differences due to physical condition should be considered as a step in the appraisal process that is subsequent to the computation of replacement cost new less depreciation (RCNLD).

The estimation of an effective year is dependent upon the appraiser's knowledge and judgment. At best, an average age of construction tends to set the latest year that should be assigned for effective age.

# DEPRECIATION

## AVERAGE LIFE TABLES

### MISCELLANEOUS IMPROVEMENTS

| <u>Use Type of Improvement</u>            | <u>Quality/Type</u> | <u>Type of Schedule</u> | <u>Average Life</u> |
|---|---------------------|-------------------------|---------------------|
| Barns (General Farm)                      | Poor                | R.                      | 20                  |
| Barns (General Farm)                      | Fair                | R.                      | 30                  |
| Barns (General Farm)                      | Good                | R.                      | 40                  |
| Barns (General Farm)                      | Excellent           | R.                      | 60                  |
| Barns, Dairy                              | Poor                | R.                      | 20                  |
| Barns, Dairy                              | Average             | R.                      | 20                  |
| Barns, Dairy                              | Good                | R.                      | 25                  |
| Cold Storage Food Lockers                 | Poor                | O.R.                    | 30                  |
| Cold Storage Food Lockers                 | Average             | O.R.                    | 40                  |
| Cold Storage Food Lockers                 | Good                | O.R.                    | 50                  |
| Cold Storage Warehouses                   | Poor                | O.R.                    | 40                  |
| Cold Storage Warehouses                   | Average             | O.R.                    | 50                  |
| Cold Storage Warehouses                   | Good                | O.R.                    | 60                  |
| Cotton Gins                               |                     | O.R.                    | 30                  |
| Drive-In Theaters                         | Poor                | O.R.                    | 20                  |
| Drive-In Theaters                         | Good                | O.R.                    | 30                  |
| Drying Sheds (Fruits & Nuts) (Wood Frame) | Poor                | R.                      | 10                  |
| Drying Sheds (Fruits & Nuts) (Wood Frame) | Fair                | R.                      | 20                  |
| Drying Sheds (Fruits & Nuts) (Wood Frame) | Good                | R.                      | 30                  |
| Fences, Wood or Wire                      | Poor                | R.                      | 10                  |
| Fences, Wood or Wire                      | Average             | R.                      | 20                  |
| Fences, Wood or Wire                      | Good                | R.                      | 30                  |
| Fences, Chain Link, Residence-Farm        | Light               | R.                      | 20                  |
| Fences, Chain Link, Industrial-Commercial | Good                | R.                      | 30                  |

# DEPRECIATION

## AVERAGE LIFE TABLES

### MISCELLANEOUS IMPROVEMENTS

| <u>Use Type of Improvement</u>        | <u>Quality/Type</u>  | <u>Type of Schedule</u> | <u>Average Life</u> |
|---------------------------------------|----------------------|-------------------------|---------------------|
| Frost Protection Wind Machines        |                      | R.                      | 30                  |
| Grain Elevators                       | Concrete and Metal   | O.R.                    | 50                  |
| Grain Storage Bins                    | Metal                | O.R.                    | 40                  |
| Grain Storage Bins                    | Concrete             | O.R.                    | 60                  |
| Greenhouses, Commercial               | Poor Wood Frame      | O.R.                    | 20                  |
| Greenhouses, Commercial               | Average              | O.R.                    | 30                  |
| Greenhouses, Commercial               | Good                 | O.R.                    | 40                  |
| Greenhouses, Conservatory (Back Yard) | Poor                 | R.                      | 10                  |
| Greenhouses, Conservatory (Back Yard) | Good                 | R.                      | 20                  |
| Hog and Sheep Sheds and Corrals       | Poor                 | R.                      | 10                  |
| Hog and Sheep Sheds and Corrals       | Fair                 | R.                      | 20                  |
| Hog and Sheep Sheds and Corrals       | Good                 | R.                      | 30                  |
| Lath Houses                           | Poor                 | R.                      | 10                  |
| Lath Houses                           | Fair                 | R.                      | 20                  |
| Lath Houses                           | Good                 | R.                      | 30                  |
| Motor Truck Scales                    | Wood Under-structure | O.R.                    | 30                  |
| Motor Truck Scales                    | Wood Under-structure | O.R.                    | 40                  |
| Poultry Houses                        | Poor                 | R.                      | 10                  |
| Poultry Houses                        | Medium               | R.                      | 20                  |
| Poultry Houses                        | Good                 | R.                      | 30                  |
| Rice Drying and Storage Plants        | Concrete and Metal   | O.R.                    | 50                  |

# DEPRECIATION

## AVERAGE LIFE TABLES

### MISCELLANEOUS IMPROVEMENTS

| <u>Use Type of Improvement</u>                                 | <u>Quality/Type</u>                               | <u>Type of Schedule</u> | <u>Average Life</u> |
|--|---|-------------------------|---------------------|
| Service Stations   | Poor Wood Frame                                   | O.R.                    | 20                  |
| Service Stations   | Good Wood Frame, or<br>Light Steel, or<br>Masonry | O.R.                    | 25                  |
| Service Stations   | Good Wood Frame, or<br>Light Steel, or<br>Masonry | O.R.                    | 30                  |
| Silos, Wood  | Poor  | R.                      | 20                  |
| Silos, Wood  | Good  | R.                      | 30                  |
| Silos, Masonry - Tile and Basalite                             |   | R.                      | 40                  |
| Silos, Masonry - Concrete                                      |   | R.                      | 50                  |
| Steel Building, Quonset or Straight<br>Wall Type (Steel Frame) | Light   | O.R.                    | 40                  |
| Steel Building, Quonset or Straight<br>Wall Type (Steel Frame) | Medium  | O.R.                    | 50                  |
| Steel Building, Quonset or Straight<br>Wall Type (Steel Frame) | Heavy   | O.R.                    | 60                  |
| Storage Sheds (Frame)  | Poor  | R.                      | 20                  |
| Storage Sheds (Frame)  | Fair  | R.                      | 30                  |
| Storage Sheds (Frame)  | Good  | R.                      | 40                  |
| Swimming Pools   | Poor  | R.                      | 10                  |
| Swimming Pools   | Fair  | R.                      | 20                  |
| Swimming Pools   | Good  | R.                      | 30                  |
| Water Tanks, Elevated  | Wood Frame and Tank                               | O.R.                    | 30                  |
| Water Tanks, Elevated  | Wood Frame and Tank                               | O.R.                    | 60                  |

---

Poor = Poorest grade of materials; not contractor erected.  
 Fair = Average materials; builder erected.  
 Good = Good materials; good design; erected by competent builder.

# DEPRECIATION

## NORMAL PERCENT GOOD TABLES - RESIDENTIAL BUILDINGS

| Age<br>Years | 20 Years Avg Life |                 | 25 Years Avg Life |                 | 30 Years Avg Life |                 | 40 Years Avg Life |                 |
|--------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|
|              | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good |
| 0            | 20                | 100             | 25                | 100             | 30                | 100             | 40                | 100             |
| 1            | 19                | 94              | 24                | 95              | 29                | 96              | 39                | 98              |
| 2            | 18                | 88              | 23                | 90              | 28                | 93              | 38                | 96              |
| 3            | 17                | 81              | 22                | 86              | 27                | 89              | 37                | 94              |
| 4            | 16                | 75              | 21                | 81              | 26                | 86              | 36                | 92              |
| 5            | 15                | 69              | 20                | 77              | 25                | 82              | 35                | 90              |
| 6            | 14                | 63              | 19                | 72              | 24                | 79              | 34                | 87              |
| 7            | 13                | 59              | 18                | 68              | 23                | 75              | 33                | 84              |
| 8            | 12                | 57              | 17                | 63              | 22                | 71              | 32                | 82              |
| 9            | 11                | 55              | 16                | 60              | 21                | 67              | 31                | 80              |
| 10           | 11                | 53              | 16                | 58              | 20                | 64              | 30                | 77              |
| 11           | 10                | 50              | 15                | 56              | 19                | 60              | 29                | 74              |
| 12           | 9                 | 48              | 14                | 54              | 19                | 59              | 28                | 72              |
| 13           | 8                 | 46              | 13                | 53              | 18                | 57              | 27                | 70              |
| 14           | 7                 | 44              | 12                | 51              | 17                | 56              | 27                | 67              |
| 15           | 7                 | 42              | 11                | 49              | 16                | 54              | 26                | 65              |
| 16           | 6                 | 40              | 11                | 48              | 15                | 53              | 25                | 62              |
| 17           | 5                 | 38              | 10                | 46              | 14                | 52              | 24                | 60              |
| 18           | 5                 | 36              | 9                 | 44              | 13                | 50              | 23                | 59              |
| 19           | 4                 | 33              | 8                 | 43              | 13                | 49              | 22                | 58              |
| 20           | 4                 | 31              | 7                 | 41              | 12                | 47              | 21                | 56              |
| 21           | 3                 | 29              | 7                 | 39              | 11                | 46              | 21                | 55              |
| 22           | 3                 | 27              | 6                 | 37              | 11                | 44              | 20                | 54              |
| 23           | 3                 | 25              | 6                 | 35              | 10                | 43              | 19                | 53              |
| 24           | 3                 | 23              | 5                 | 34              | 9                 | 42              | 18                | 52              |
| 25           | 2                 | 21              | 5                 | 32              | 9                 | 40              | 17                | 51              |
| 26           | 2                 | 19              | 4                 | 30              | 8                 | 39              | 17                | 50              |
| 27           | 2                 | 16              | 4                 | 29              | 7                 | 37              | 16                | 49              |
| 28           | 2                 | 14              | 4                 | 27              | 7                 | 36              | 15                | 48              |
| 29           | 2                 | 12              | 3                 | 25              | 6                 | 34              | 14                | 47              |
| 30           | 1                 | 10              | 3                 | 24              | 6                 | 33              | 14                | 46              |
| 31           |                   |                 | 3                 | 22              | 5                 | 31              | 13                | 45              |
| 32           |                   |                 | 3                 | 20              | 5                 | 30              | 12                | 44              |
| 33           |                   |                 | 2                 | 18              | 5                 | 29              | 12                | 43              |
| 34           |                   |                 | 2                 | 17              | 4                 | 17              | 11                | 42              |
| 35           |                   |                 | 2                 | 15              | 4                 | 26              | 11                | 41              |
| 36           |                   |                 | 2                 | 13              | 4                 | 24              | 10                | 40              |
| 38           |                   |                 | 1                 | 10              | 3                 | 21              | 9                 | 38              |
| 40           |                   |                 |                   |                 | 2                 | 19              | 7                 | 35              |
| 42           |                   |                 |                   |                 | 2                 | 16              | 6                 | 33              |
| 46           |                   |                 |                   |                 | 1                 | 10              | 5                 | 29              |
| 50           |                   |                 |                   |                 |                   |                 | 4                 | 25              |
| 55           |                   |                 |                   |                 |                   |                 | 3                 | 20              |
| 60           |                   |                 |                   |                 |                   |                 | 2                 | 14              |
| 64           |                   |                 |                   |                 |                   |                 | 1                 | 10              |

# DEPRECIATION

## NORMAL PERCENT GOOD TABLES - RESIDENTIAL BUILDINGS

| Age<br>Years | 45 Years Avg Life |                 | 50 Years Avg Life |                 | 55 Years Avg Life |                 | 60 Years Avg Life |                 |
|--------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|
|              | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good |
| 0            | 45                | 100             | 50                | 100             | 55                | 100             | 60                | 100             |
| 2            | 43                | 97              | 48                | 97              | 53                | 98              | 58                | 98              |
| 4            | 41                | 93              | 46                | 94              | 51                | 96              | 56                | 96              |
| 6            | 39                | 89              | 44                | 91              | 49                | 94              | 54                | 94              |
| 8            | 37                | 85              | 42                | 88              | 47                | 91              | 52                | 92              |
| 10           | 35                | 81              | 40                | 85              | 45                | 88              | 50                | 90              |
| 12           | 33                | 77              | 38                | 82              | 43                | 85              | 48                | 88              |
| 14           | 32                | 73              | 36                | 78              | 41                | 82              | 46                | 86              |
| 16           | 30                | 69              | 35                | 74              | 40                | 79              | 45                | 83              |
| 18           | 28                | 65              | 33                | 70              | 38                | 76              | 43                | 80              |
| 20           | 26                | 60              | 31                | 67              | 36                | 73              | 41                | 77              |
| 22           | 24                | 58              | 29                | 63              | 34                | 69              | 39                | 74              |
| 24           | 23                | 56              | 28                | 60              | 32                | 65              | 37                | 71              |
| 26           | 22                | 54              | 26                | 58              | 31                | 62              | 35                | 68              |
| 28           | 20                | 52              | 24                | 56              | 29                | 60              | 34                | 65              |
| 30           | 18                | 50              | 23                | 54              | 27                | 58              | 32                | 63              |
| 32           | 17                | 48              | 21                | 53              | 26                | 56              | 30                | 60              |
| 34           | 15                | 47              | 20                | 51              | 24                | 55              | 29                | 58              |
| 36           | 14                | 45              | 18                | 49              | 23                | 53              | 27                | 57              |
| 38           | 12                | 43              | 17                | 47              | 21                | 51              | 26                | 55              |
| 40           | 11                | 41              | 16                | 45              | 20                | 50              | 24                | 54              |
| 42           | 10                | 39              | 14                | 44              | 19                | 48              | 23                | 52              |
| 44           | 9                 | 37              | 13                | 42              | 17                | 46              | 21                | 51              |
| 46           | 8                 | 35              | 12                | 40              | 16                | 45              | 20                | 49              |
| 48           | 7                 | 33              | 11                | 38              | 15                | 43              | 19                | 47              |
| 50           | 6                 | 31              | 10                | 37              | 14                | 41              | 18                | 46              |
| 52           | 5                 | 29              | 9                 | 35              | 12                | 40              | 16                | 44              |
| 54           | 5                 | 28              | 8                 | 33              | 11                | 38              | 15                | 43              |
| 56           | 4                 | 26              | 7                 | 31              | 10                | 36              | 14                | 41              |
| 58           | 4                 | 24              | 6                 | 30              | 9                 | 35              | 13                | 40              |
| 60           | 3                 | 22              | 5                 | 28              | 8                 | 33              | 12                | 38              |
| 62           | 3                 | 20              | 4                 | 26              | 7                 | 31              | 11                | 37              |
| 64           | 3                 | 18              | 4                 | 24              | 6                 | 30              | 10                | 35              |
| 66           | 2                 | 16              | 3                 | 22              | 5                 | 28              | 9                 | 33              |
| 68           | 2                 | 14              | 3                 | 21              | 5                 | 27              | 8                 | 32              |
| 70           | 2                 | 12              | 3                 | 19              | 4                 | 25              | 7                 | 30              |
| 72           | 1                 | 10              | 2                 | 17              | 4                 | 23              | 6                 | 29              |
| 76           |                   |                 | 2                 | 14              | 3                 | 20              | 5                 | 26              |
| 80           |                   |                 | 1                 | 10              | 2                 | 17              | 4                 | 23              |
| 84           |                   |                 |                   |                 | 1                 | 10              | 2                 | 16              |
| 96           |                   |                 |                   |                 |                   |                 | 1                 | 10              |

# DEPRECIATION

## NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

| Age<br>Years | 20 Years Avg Life |                 | 25 Years Avg Life |                 | 30 Years Avg Life |                 | 35 Years Avg Life |                 |
|--------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|
|              | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good |
| 0            | 20                | 100             | 25                | 100             | 30                | 100             | 40                | 100             |
| 1            | 19                | 95              | 24                | 97              | 29                | 98              | 34                | 99              |
| 2            | 18                | 90              | 23                | 93              | 28                | 96              | 33                | 97              |
| 3            | 17                | 85              | 22                | 90              | 27                | 93              | 32                | 95              |
| 4            | 16                | 79              | 21                | 86              | 26                | 90              | 31                | 93              |
| 5            | 15                | 73              | 20                | 82              | 25                | 88              | 30                | 91              |
| 6            | 14                | 67              | 19                | 78              | 24                | 85              | 29                | 89              |
| 7            | 13                | 61              | 18                | 74              | 23                | 82              | 28                | 87              |
| 8            | 12                | 56              | 17                | 70              | 22                | 79              | 27                | 85              |
| 9            | 11                | 51              | 16                | 65              | 21                | 75              | 26                | 83              |
| 10           | 10                | 49              | 15                | 60              | 20                | 72              | 25                | 80              |
| 11           | 9                 | 48              | 14                | 56              | 19                | 68              | 24                | 78              |
| 12           | 9                 | 46              | 13                | 52              | 18                | 65              | 23                | 75              |
| 13           | 8                 | 44              | 12                | 50              | 17                | 61              | 22                | 72              |
| 14           | 7                 | 43              | 11                | 48              | 16                | 58              | 21                | 69              |
| 15           | 6                 | 43              | 10                | 47              | 15                | 54              | 20                | 66              |
| 16           | 6                 | 41              | 9                 | 46              | 14                | 50              | 19                | 63              |
| 17           | 5                 | 39              | 8                 | 45              | 13                | 49              | 18                | 60              |
| 18           | 5                 | 38              | 8                 | 44              | 12                | 48              | 17                | 57              |
| 19           | 5                 | 37              | 7                 | 43              | 12                | 47              | 16                | 54              |
| 20           | 4                 | 35              | 7                 | 42              | 11                | 47              | 15                | 51              |
| 21           | 4                 | 34              | 6                 | 41              | 11                | 46              | 14                | 50              |
| 22           | 4                 | 33              | 6                 | 40              | 10                | 45              | 13                | 49              |
| 23           | 3                 | 32              | 5                 | 39              | 10                | 44              | 13                | 48              |
| 24           | 3                 | 30              | 5                 | 38              | 9                 | 43              | 12                | 47              |
| 25           | 3                 | 29              | 5                 | 37              | 9                 | 43              | 12                | 47              |
| 26           | 3                 | 28              | 4                 | 36              | 8                 | 42              | 11                | 46              |
| 27           | 2                 | 27              | 4                 | 35              | 8                 | 41              | 11                | 45              |
| 28           | 2                 | 25              | 4                 | 34              | 7                 | 40              | 10                | 44              |
| 29           | 2                 | 24              | 4                 | 33              | 7                 | 39              | 10                | 43              |
| 30           | 2                 | 22              | 3                 | 32              | 6                 | 38              | 9                 | 43              |
| 31           | 2                 | 21              | 3                 | 31              | 6                 | 37              | 9                 | 42              |
| 32           | 1                 | 20              | 3                 | 30              | 5                 | 36              | 8                 | 42              |
| 33           |                   |                 | 3                 | 29              | 5                 | 35              | 8                 | 41              |
| 34           |                   |                 | 3                 | 28              | 5                 | 35              | 7                 | 40              |
| 35           |                   |                 | 2                 | 27              | 5                 | 34              | 7                 | 39              |
| 36           |                   |                 | 2                 | 26              | 4                 | 33              | 6                 | 38              |
| 38           |                   |                 | 2                 | 24              | 4                 | 32              | 6                 | 37              |
| 40           |                   |                 | 2                 | 22              | 3                 | 30              | 5                 | 36              |
| 42           |                   |                 | 1                 | 20              | 3                 | 28              | 5                 | 34              |
| 45           |                   |                 |                   |                 | 2                 | 26              | 4                 | 32              |
| 48           |                   |                 |                   |                 | 2                 | 23              | 3                 | 30              |
| 52           |                   |                 |                   |                 | 1                 | 20              | 3                 | 27              |
| 56           |                   |                 |                   |                 |                   |                 | 2                 | 24              |
| 62           |                   |                 |                   |                 |                   |                 | 1                 | 20              |

# DEPRECIATION

## NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

| Age<br>Years | 40 Years Avg Life |                 | 45 Years Avg Life |                 | 50 Years Avg Life |                 | 55 Years Avg Life |                 |
|--------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|
|              | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good | Rem Life<br>Years | Percent<br>Good |
| 0            | 40                | 100             | 45                | 100             | 50                | 100             | 55                | 100             |
| 2            | 38                | 98              | 43                | 99              | 48                | 99              | 53                | 99              |
| 4            | 36                | 96              | 41                | 97              | 46                | 98              | 51                | 98              |
| 6            | 34                | 93              | 39                | 95              | 44                | 97              | 49                | 97              |
| 8            | 32                | 90              | 37                | 93              | 42                | 95              | 47                | 96              |
| 10           | 30                | 86              | 35                | 90              | 40                | 93              | 45                | 95              |
| 12           | 28                | 82              | 33                | 87              | 38                | 91              | 43                | 94              |
| 14           | 26                | 78              | 31                | 84              | 36                | 88              | 41                | 92              |
| 16           | 24                | 73              | 29                | 81              | 34                | 85              | 39                | 90              |
| 18           | 22                | 68              | 27                | 77              | 32                | 82              | 37                | 88              |
| 20           | 20                | 63              | 25                | 73              | 30                | 80              | 35                | 86              |
| 22           | 18                | 58              | 23                | 69              | 28                | 77              | 33                | 83              |
| 24           | 17                | 53              | 21                | 65              | 26                | 73              | 31                | 80              |
| 26           | 15                | 50              | 20                | 60              | 24                | 69              | 29                | 77              |
| 28           | 14                | 48              | 18                | 55              | 23                | 65              | 27                | 74              |
| 30           | 13                | 47              | 17                | 50              | 21                | 61              | 26                | 71              |
| 32           | 11                | 45              | 15                | 49              | 20                | 57              | 24                | 67              |
| 34           | 10                | 44              | 14                | 48              | 18                | 53              | 22                | 63              |
| 36           | 9                 | 43              | 13                | 47              | 17                | 50              | 21                | 59              |
| 38           | 8                 | 42              | 12                | 46              | 16                | 48              | 19                | 55              |
| 40           | 8                 | 40              | 11                | 44              | 14                | 47              | 18                | 52              |
| 42           | 7                 | 39              | 10                | 43              | 13                | 46              | 17                | 50              |
| 44           | 6                 | 38              | 9                 | 42              | 12                | 45              | 16                | 49              |
| 46           | 6                 | 36              | 8                 | 41              | 11                | 44              | 15                | 48              |
| 48           | 5                 | 35              | 7                 | 40              | 10                | 43              | 14                | 47              |
| 50           | 5                 | 34              | 7                 | 38              | 10                | 42              | 13                | 45              |
| 52           | 4                 | 32              | 6                 | 37              | 9                 | 41              | 12                | 44              |
| 54           | 4                 | 31              | 6                 | 36              | 8                 | 40              | 11                | 43              |
| 56           | 3                 | 30              | 5                 | 35              | 8                 | 39              | 10                | 42              |
| 58           | 3                 | 29              | 5                 | 34              | 7                 | 38              | 9                 | 41              |
| 60           | 3                 | 27              | 4                 | 32              | 7                 | 37              | 9                 | 40              |
| 62           | 2                 | 26              | 4                 | 31              | 6                 | 36              | 8                 | 39              |
| 64           | 2                 | 25              | 4                 | 30              | 6                 | 35              | 8                 | 38              |
| 66           | 2                 | 24              | 3                 | 29              | 5                 | 34              | 7                 | 37              |
| 68           | 2                 | 22              | 3                 | 28              | 5                 | 33              | 7                 | 36              |
| 70           | 2                 | 21              | 3                 | 27              | 4                 | 32              | 6                 | 36              |
| 72           | 1                 | 20              | 3                 | 25              | 4                 | 31              | 6                 | 35              |
| 74           |                   |                 | 2                 | 24              | 5                 | 30              | 5                 | 34              |
| 76           |                   |                 | 2                 | 23              | 3                 | 28              | 5                 | 32              |
| 82           |                   |                 | 1                 | 20              | 3                 | 26              | 4                 | 30              |
| 84           |                   |                 |                   |                 | 2                 | 24              | 4                 | 29              |
| 88           |                   |                 |                   |                 | 2                 | 22              | 3                 | 27              |
| 92           |                   |                 |                   |                 | 1                 | 20              | 2                 | 25              |
| 96           |                   |                 |                   |                 |                   |                 | 2                 | 23              |
| 102          |                   |                 |                   |                 |                   |                 | 1                 | 20              |



# DEPRECIATION

## NORMAL PERCENT GOOD TABLES - OTHER THAN RESIDENTIAL BUILDINGS

| Age Years | 60 Years Average Life |              | 70 Years Average Life |              |
|-----------|-----------------------|--------------|-----------------------|--------------|
|           | Remaining Life Years  | Percent Good | Remaining Life Years  | Percent Good |
| 0         | 60                    | 100          | 70                    | 100          |
| 2         | 58                    | 99           | 68                    | 99           |
| 4         | 56                    | 99           | 66                    | 99           |
| 6         | 54                    | 98           | 64                    | 99           |
| 8         | 52                    | 97           | 62                    | 98           |
| 10        | 50                    | 96           | 60                    | 98           |
| 12        | 48                    | 95           | 58                    | 97           |
| 14        | 46                    | 94           | 56                    | 96           |
| 16        | 44                    | 93           | 54                    | 96           |
| 18        | 42                    | 92           | 52                    | 95           |
| 20        | 40                    | 89`          | 50                    | 94           |
| 22        | 38                    | 87           | 48                    | 93           |
| 24        | 36                    | 85           | 46                    | 92           |
| 26        | 34                    | 83           | 45                    | 91           |
| 28        | 32                    | 81           | 42                    | 89           |
| 30        | 30                    | 78           | 40                    | 87           |
| 32        | 29                    | 75           | 39                    | 85           |
| 34        | 27                    | 72           | 37                    | 83           |
| 36        | 25                    | 69           | 35                    | 81           |
| 38        | 24                    | 66           | 33                    | 79           |
| 40        | 22                    | 63           | 31                    | 76           |
| 42        | 21                    | 60           | 30                    | 73           |
| 44        | 20                    | 56           | `29                   | 70           |
| 46        | 18                    | 52           | 27                    | 67           |
| 48        | 17                    | 49           | 26                    | 64           |
| 50        | 16                    | 48           | 25                    | 61           |
| 52        | 15                    | 47           | 23                    | 58           |
| 54        | 14                    | 46           | 22                    | 56           |
| 56        | 13                    | 46           | 21                    | 54           |
| 58        | 12                    | 45           | 20                    | 52           |
| 60        | 11                    | 44           | 19                    | 50           |
| 64        | 10                    | 42           | 17                    | 48           |
| 68        | 9                     | 40           | 15                    | 46           |
| 72        | 8                     | 38           | 13                    | 44           |
| 76        | 7                     | 36           | 12                    | 43           |
| 80        | 6                     | 35           | 11                    | 41           |
| 86        | 5                     | 32           | 9                     | 39           |
| 92        | 4                     | 29           | 8                     | 36           |
| 100       | 3                     | 25           | 6                     | 33           |
| 108       | 2                     | 22           | 4                     | 29           |
| 112       | 1                     | 20           | 3                     | 27           |
| 122       |                       |              | 2                     | 24           |
| 130       |                       |              | 1                     | 20           |